

Web security architects are a new breed in high demand, combining security with e-commerce skills. Page 82

They're smart, savvy and would rather work in a conventional corporate IT organization than at a Web start-up. Page 50

An FTC panel wrangles over rules for consumer data: Amazon.com faces privacy suits. Page 2

COMPUTERWORLD

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WEBMASTERS HELP FBI HUNT NET VANDALS

Companies rocked by denial-of-service attacks; Clinton calls security summit with IT, providers

BY ANN HARRISON

IT managers at companies victimized by attacks through the Internet are busy submitting logs to government investigators amid calls for closer monitoring of network traffic and malicious code that turns computer systems into unwitting launchpads for cyberhervandals.

President Clinton will convene a meeting tomorrow of government officials, Internet companies and Web site providers to discuss a "long-term plan" to stanch distrib-

uted denial-of-service attacks.

The FBI is investigating the source of the attacks. Attorney General Janet Reno said the government still doesn't know who instigated them, where they originated, how many computers were involved or the motives of the perpetrators.

But they were effective. "We experienced IGB in a second, and we can handle 100M bit/sec. on a typical strong day operating at 30% capacity. During the attack, we had eight to 10

Attacks, page 14

E-MARKETS LACK BACK-END TIES

Few integrate data for buying, selling online

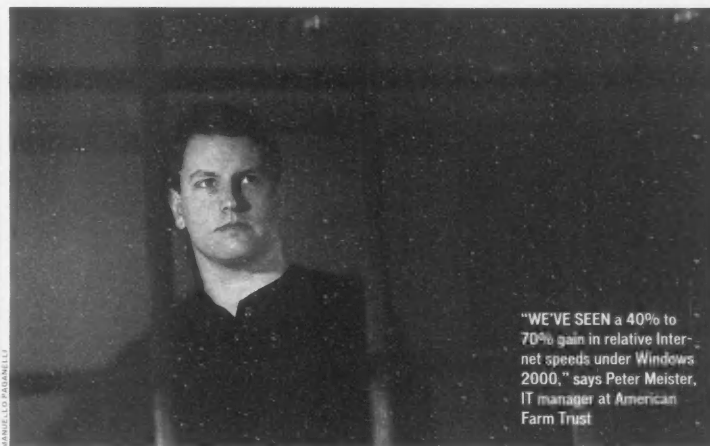
BY JULIA KING

Chemicals, oil, paper, even water. Name any industry and you will likely find an online digital exchange or electronic marketplace promising huge efficiency gains and lower costs through electronic buying and selling.

By 2004, the Internet will be home to online marketplaces that account for 53% of \$2.7 trillion in business-to-business e-commerce, according to a report released last week by Forrester Research Inc. in Cambridge, Mass.

The dirty little secret is that few, if any, of the marketplaces fully integrate things like inventory and shipping data to buyers' and sellers' enterprise systems. As a result, many of the same supply-chain inefficiencies remain, such as an inability to quickly confirm or

E-Markets, page 16



"WE'VE SEEN a 40% to 70% gain in relative Internet speeds under Windows 2000," says Peter Meister, IT manager at American Farm Trust.

ROAD MAP TO WINDOWS 2000

LOOKING FOR A SOBER VIEW of Microsoft's new operating system? Cynthia Morgan and Russell Kay offer a hype-free analysis of the strengths and weaknesses of Windows 2000 for corporate America, covering topics such as stability, security, scalability, Active Directory and the challenges of managing a mixed NT/2000 environment. Plus, we offer a decision tree to help IT managers figure out whether — and when — to take the Windows 2000 plunge.

Stories begin on page 68.

THIN CLIENTS TO GET WIN 2K BOOST

OS support expected to cut costs, spur adoption

BY DOMINIQUE DECKMYN

Thin clients have so far failed to make major inroads in corporate markets. But users and analysts say Windows 2000 may change that.

With the launch of Windows 2000 Server and the inclusion of Terminal Services as a standard feature, support for thin clients will no longer be an ex-

pensive add-on. That could ignite sales of thin clients, said Eileen O'Brien, an analyst at International Data Corp. in Framingham, Mass. She said she expects total thin-client sales, estimated at a mere 650,000 units for last year, to almost double to 1.2 million this year. Most of the growth will come from Windows-based terminals, rather than Java-based ones or other thin clients, said O'Brien.

Thin Clients, page 91

More Inside

■ **News:** Microsoft has trained some 9,400 support reps for the Windows 2000 rollout. But will it be enough? Page 91

■ **Opinions:** David Moschella questions Win 2k's long-term impact; Allan Alter looks at the short term. Page 33

■ Online: Our Win 2k Watch has forums, case studies, surveys and more. www.computerworld.com/win2k

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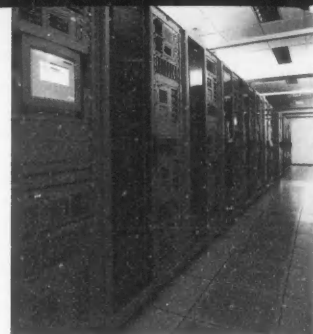
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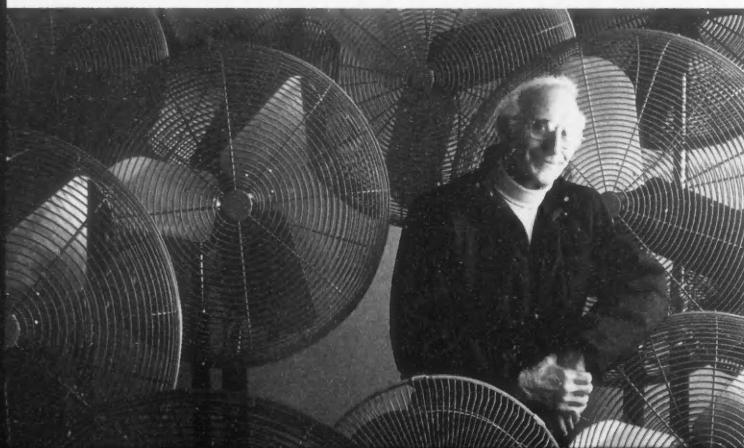
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HACKER ATTACKER

Catching hackers is notoriously hard, but specialists like Jeffrey Hormann, commander of the Army's anti-computer-crime squad, are finding ways to track them to their lairs. Page 38

FIRST DISPOSABLE PC?

Compaq aims its sleek, affordable and easily replaceable iPaq at corporate IT managers for whom desktop hardware is less important than network infrastructure and software. Page 64



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NEWS

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- 4 DISABILITIES ACT** may force government sites to be handicapped-accessible; will business sites have to respond?
- 6 MERGERS RAISE** training companies from mom-and-pop shops to enterprise educators.
- 8 SAP USERS TEST** beta of data warehousing app, but the jury is out on whether it's good enough for heavy-duty use.
- 10 STORAGE TEK USERS** hope the company will reverse bad results, calling alternatives too expensive.
- 12 FORD CONNECTS** Cisco to auto exchange network, hoping it will make drop-in Internet packages easy enough for dealers to use.
- 14 FBI ISSUES** code to help users detect and repel denial-of-service attacks.
- 20 IT WILL DIE** as a separate department, Forrester predicts. "Bah!" say CIOs.
- 28 AKAMAI ACQUISITION** was designed to expand its Web fast-delivery service to include audio, video.

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- 48 SEARS SPIN-OFF OFFERS** the excitement of a start-up and a chance to try to build infrastructure on Windows 2000.
- 50 NET KIDS** want it all, but some want to get it from traditional companies, not dot-coms.
- 52 ERP CAREER** options shift from installation of applications to systems integration.
- 54 CHANGE MANAGEMENT** is more than a buzzword; it's a series of techniques to measure the impact of IT-enabled improvements.
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- 68 LEARN WHETHER**, when and how to migrate to Win 2k.
- EMERGING COMPANIES**
- 76 METAGON** Technologies ties disparate databases into a single, uniform structure.
- JOB WATCH**
- 82 WEB SECURITY** architect may sound like a glamorous title, but the work can be tedious.

THE BIG CHALLENGE [IS] DATA MANAGEMENT, AND THAT CAN'T BE DONE BY ANYBODY BUT US, AND THAT'S JUST THE UGLY TRUTH.

RAY SASSO, CIO AT J. R. SIMPLOT CO., REACTING TO A FORRESTER RESEARCH INC. REPORT SAYING CIOs' DAYS ARE NUMBERED. SEE PAGE 20.

OPINIONS

- 32 MARK HALL** thinks the spate of denial-of-service attacks on several popular Web sites proves the Web is turning into a tough neighborhood.
- 33 DAVID MOSCHELLA** predicts that the impact of Windows 2000 on the future of computing will fall far short of its hype.

- 34 BOB CAMPBELL** of Deloitte Consulting charges that the government is squandering a golden opportunity to use the Internet to transform itself.
- 34 JANE LINDER** and Drew Phelps of Andersen Consulting argue that IT is still lacking the key ability to make information posted on the Net easy to read.
- 40 KEVIN FOGARTY** advises if you want to get into B-to-B

e-commerce, learn how to sell technology from the experts.

- 48 PETER G. W. KEEN** warns that IT isn't doing enough to automate logistics — a role that could make it a money-maker.
- 92 FRANK HAYES** bristles at predictions that IT departments will go away in three years. He says the old IT shop actually died out years ago.

Hitachi Regains Iron Peak

Trinium Nine is roughly twice as powerful as IBM's Generation 6 mainframes

BY JAIKUMAR VIJAYAN
AND CRAIG STEDMAN

HITACHI DATA Systems' new Skyline Trinium Nine mainframes, unveiled last week, once again redefine the big in big iron.

The System 390-compatible servers can support as many as 16 processors, each one capable of crunching 262 MIPS, delivering a combined performance of more than 3,000 MIPS. That's roughly twice the peak 1,600 MIPS delivered on IBM's highest-end Generation 6 mainframes.

Not many companies require even close to that kind of horsepower, said Mike Chuba, an analyst at Gartner Group Inc. in Stamford, Conn.

"It is aimed at only about the top 5% of the S/390 market, which also happens to be the most lucrative and fastest-growing" mainframe segment, Chuba said.

Such systems are likely to be used primarily in Fortune 100 companies that are ramping up legacy applications and infrastructures to keep pace with business growth, Chuba added.

The new systems "will basically complement our existing capacity," said John Sommerfield, corporate communications director at San Francisco-based Charles Schwab & Co., which plans to buy one of the new systems.

Schwab's mainframes host much of the data and perform all the back-end processing that powers the company's regular and online trading activities. With more than 200,000 transactions processed each day, "the need for [processing] capacity is enormous," Sommerfield said.

Other companies that have already signed up to buy the systems include Aetna Health & Life Insurance Co., Hongkong and Shanghai Bank and Telcel, a telecommunications company in Mexico, according to Hitachi, which is based in Santa Clara, Calif.

Like earlier models, the Trinium Nines are based on hybrid processors that combine the low power consumption and floor-space savings of CMOS technology with the speed of the older emitter-coupled logic designs.

The systems feature Hitachi's Virtual Server Facility, which allows administrators to slice a single server into as many as 15 unique partitions, each of which can run different applications. The feature al-

lows software vendors to base license charges on just the portion of the mainframe on which their product is running, rather than on the overall capacity of the system, thereby lowering costs for users.

The Trinium Nine Series was scheduled for shipment last fall, but problems limited Hitachi to releasing a 12-processor version that didn't leapfrog IBM's machines enough to provide a compelling alternative, said Carl Greiner, an analyst at Meta Group Inc. in Stamford, Conn.

As a result, Hitachi's 1999 sales were "absolutely terrible," Greiner said. Hitachi had

a 21% share of the mainframe market in 1997, dropped back to 14% in 1998 and did worse last year, according to Greiner. Hitachi "almost fell off the map in

'99. IBM went after them, and they couldn't hold their own. Now they've got a big banger out there again," he said.

Mainframe vendors typically don't publish prices, but Greiner said Meta Group has seen Trinium Nine bids ranging from \$1,700 to \$2,000 per MIPS. ■

Trinium Rivalry

How Hitachi's Trinium Nines stack up against rivals:

VENDOR	MODEL	PROCESSORS SUPPORTED	MIPS/PROCESSOR	TOTAL MIPS RATING
Hitachi	Skyline Trinium Nine	16	262	3,000
IBM	Generation 6	12	200	1,600
Amdahl	Millennium 2000	16	150	1,600

Amazon, Subsidiary Face Privacy Lawsuits, FTC Inquiry

FTC investigates violation complaint

BY CAROL SLIWA

An Amazon.com Inc. subsidiary faces two class-action lawsuits and an informal inquiry from the Federal Trade Commission (FTC) on allegations that it secretly collected personal data from its software users and transmitted that data to third parties, including Amazon.

Seattle-based Amazon.com, which is also named as a defendant in the suits, disclosed the information last week in a filing with the Securities and Exchange Commission. Amazon's subsidiary, San Francisco-based Alexa Internet Corp., makes and distributes software that can be added to browsers to aid users in Web navigation.

Amazon and Alexa said the charges have no merit and Alexa is fully cooperating with the FTC on a voluntary basis.

The FTC would neither confirm nor deny that it's conducting an investigation. But Richard Smith, an Internet consultant in Brookline, Mass., acknowledged that he complained to the FTC late last year about the way Alexa collects personal data.

Information based on data

that Alexa collects and stores about Web sites users visit is made available to Alexa users. The information can include, for example, the domain name's registrant, the company's annual revenue, site popularity ratings, reviews of sites and related links.

Smith said that every time an Alexa user visits a new Web page, the address is sent to Alexa. "The issue is that sometimes [Web addresses] contain personal, identifiable data in the query string — including things like e-mail address, name, home address — and that information is being sent back to Alexa," he said.

Alexa spokeswoman Dia Cheney said usage-path information is stored anonymously and separately from e-mail addresses or any demographic information that users provide. "We have no means for correlating that information," she said. "Our databases were designed to protect the privacy of the users, and we have very strict privacy policies."

Alexa does sell some of the information it collects, including a listing of the top 100,000 sites and other similar information, Cheney said. But she stressed that it's "aggregate data" that isn't tied to specific consumers. ■

Panel discusses just how far it could go

BY PATRICK THIBODEAU
WASHINGTON

The Federal Trade Commission's advisory panel on Internet privacy policy is wrestling with the related issue of how much the security of consumer data should be regulated, too.

Security is intertwined with privacy and would likely be a key part of privacy regulations the commission proposes, experts on the 40-member panel said.

"Poor security leads to enormous privacy violations, so they are clearly linked," said committee member Mary Culnan, a privacy expert at Georgetown University in Washington, at the panel's first meeting this month.

Meanwhile, the FTC is surveying commercial Web sites to determine whether self-regulation is working. It will check for privacy notices and examine whether sites disclose how collected information is used.

This is the FTC's third annual survey. It didn't recommend regulations last year, after the survey showed a sharp rise in the number of sites offering privacy policies.

But the FTC has warned that its hands-off policy could

change if commercial Web sites fail to make progress.

While this issue is debated by lawmakers, regulators don't know just how far they could go to mandate security measures at company Web sites.

The panel has been asked to look at the cost and benefits of security policies it considers.

Privacy advocates warn that poor security can have enormous privacy implications for a company's customers.

"We have to really investigate where the liability of security breakdowns should lie, because I think such security breakdowns are inevitable," said Andrew Shen, a policy analyst at the Electronic Privacy Information Center in Washington.

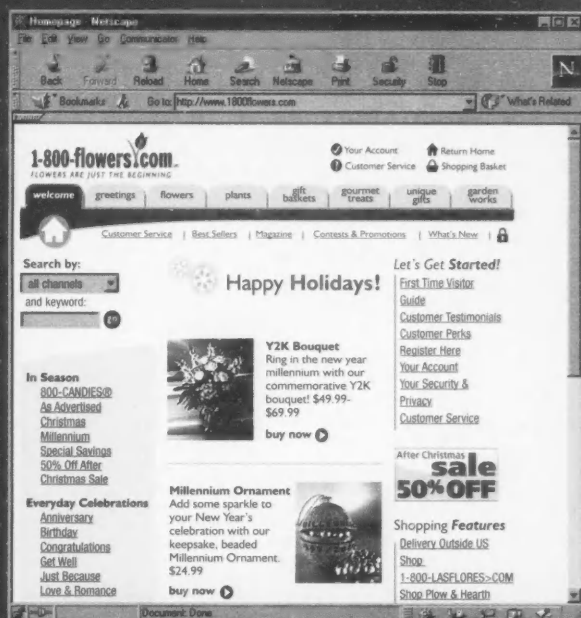
But Lawrence Ponemon, a risk management consultant at New York-based PricewaterhouseCoopers, said that even if there were agreement on the level of security, "I don't think a company would be able to spend that much money without going bankrupt."

Another issue is how to separate data that's collected online from data that isn't.

"A lot of off-line data-gathering is being commingled with data that is being gathered online," said Richard Purcell, director of the corporate privacy group at Microsoft Corp. He questioned whether the panel's scope should be limited. ■

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AT DEADLINE Co-op Sues Oracle

Tri Valley Growers, an \$800 million farming cooperative in San Ramon, Calif., last week sued Oracle Corp. over a canceled installation of its application bundle for consumer goods companies. The cooperative charged Oracle with fraud and breach of contract and is seeking more than \$20 million in damages. Oracle officials couldn't be reached for comment by press time.

Takeover Integration

After first agreeing to merge with American Home Products Corp. in Madison, N.J., [News, Nov. 8, 1999] Warner-Lambert Co. in Morris Plains, N.J., last week accepted a \$90 billion takeover bid from Pfizer Inc. in New York. Technology that needs to be combined includes systems from SAP AG and Denver-based J. D. Edwards & Co. at Warner-Lambert and systems from SAP, Oracle Corp. and PeopleSoft Inc. at Pfizer.

SAP Shifts Show Date

SAP AG is shifting its U.S. user conference in Las Vegas from September to June this year — a move that forced the Instrument Society of America (ISA) to change its manufacturing systems conference originally scheduled for the same week. ISA in Research Triangle Park, N.C., said the manufacturing conference will be combined with another event in New Orleans two months later.

Short Takes

BANK OF AMERICA CORP. last week purchased the domain name loans.com for \$3 million, the highest price ever paid for a domain name at auction, the Charlotte, N.C.-based company said. . . . **SUN MICROSYSTEMS INC.** announced that new versions of its Java 2 Platform Enterprise Edition and Java 2 Platform Standard Edition have been submitted to its Java Community Process program, which lets participating vendors help evolve the technology. . . . Computer services firm **KEANE INC.** in Boston posted fourth-quarter losses of \$3.2 million, compared with gains of \$23.6 million in the same period the previous year.

Hospital Signs \$270M Outsourcing Deal

With an eye toward e-business, St. Joseph Health System will off-load core IT

BY JULEKHA DASH

ST. JOSEPH Health System last week signed a 10-year, \$270 million outsourcing deal with Dallas-based Perot Systems Corp., which will provide information technology services for 15 hospitals in California and Texas.

The health care provider hopes to off-load routine IT operations to Perot and focus on more strategic IT projects, such as electronic business.

The contract includes financial incentives for Perot to achieve certain IT service levels, said Ben Williams, CIO at

Orange, Calif.-based St. Joseph.

For instance, Williams said, end-user calls to the help desk must be answered within 30 seconds on average. And St. Joseph's online system should have more than 98% availability, he added.

Strategic Move

Outsourcing day-to-day operations will enable the eight senior-level IT executives — out of a total 325 IT employees — that remain with St. Joseph to concentrate on more strategic initiatives. Details haven't yet been determined, but according to Williams, the goal

JUST THE FACTS St. Joseph/ Perot Deal

■ \$270M, 10-year outsourcing contract

■ IT operations at 15 hospitals will be managed by Perot

■ 240 employees from St. Joseph's IT staff will move to Perot

■ Eight high-level IT executives will remain with St. Joseph; others will be downsized

of future electronic-business projects will be to enable patients to register online as well as allow physicians to better communicate with the hospital and patients. Perot will help determine St. Joseph's electronic-business strategy, but that task wasn't included in this contract, Williams said.

"Just about every hospital is talking about e-health" these days, said Mark Anderson, a former hospital CIO who is now a health care analyst at Meta Group Inc. in Stamford, Conn.

But there aren't many hospitals that know how to actually accomplish the goal, he added.

St. Joseph is at least the third hospital in the past six months to sign an outsourcing agreement worth more than \$200 million.

In November, New York Presbyterian Hospital signed a \$200 million outsourcing deal with First Consulting Group Inc. in Long Beach, Calif. [News, Nov. 15]. And last August, the Detroit Medical Center inked a 10-year, \$1 billion contract with CareTech Solutions Inc. in Farmington Hills, Mich.

Matt Duncan, an analyst at Gartner Group Inc. in Stamford, Conn., said more health care organizations are turning to outsourcing as they determine that "IT is not [their] core competency." ■

Congress Considers ADA's Relevance to Web

Feds expected to issue rules for users' accessibility

BY PATRICK THIBODEAU
WASHINGTON

The federal government is on the verge of requiring its own Web sites to comply with the Americans With Disabilities Act (ADA), which prohibits discrimination against people with disabilities such as impaired vision or hearing.

Are business Web sites next? Next month, the government will issue accessibility rules governing the Web sites run by federal agencies. For example, streaming audio or audio files

will have to be accompanied by text. The rules may also require captioning for video and restrict the use of color to display information.

Advocates for the disabled say making a Web site accessible — such as including text with audio or video files — isn't difficult. Moreover, they say commercial Web sites that aren't accessible are losing out on customers.

"What we need is achievable; what we are asking for is reasonable," said Gary Wunder, a programmer/analyst at the University of Missouri and a board member of the National Federation of the Blind.

It's possible that the federal rules could become models for broader regulations affecting the private sector.

But for now, the legal issues for business Web sites are "exceedingly unsettled," said Elizabeth Dorminey, an attorney at Wimberly, Lawson, Steckel Nelson & Schneider PC in Athens, Ga.

The U.S. Department of Justice has determined that the ADA covers Web sites. But Dorminey said the ADA covers

only "public accommodations," not the Internet. Others disagree, and the issue is now in court.

In what may be the key case, the National Federation of the Blind filed a lawsuit against America Online Inc. last fall charging that the company's online service violated the ADA. At the time the lawsuit was filed, Dulles, Va.-based AOL said it was working to improve accessibility.

Congress is also investigating. At a hearing last week, Dennis Hayes, creator of the

Hayes modem and now chairman of the U.S. Internet Industry Association, urged the House Judiciary Committee's constitution subcommittee to focus on voluntary efforts through standards bodies.

Hayes warned that basing regulation on the technologies of today could limit the development of better access tools.

"It will take years to work out in courts how the ADA will apply," Hayes said. "In those same years, the standards can proceed much more rapidly."

The World Wide Web Consortium, a vendor-neutral standards body, last year released technical guidelines for improving Web accessibility. ■

FedEx Domain Suit Filed

BY LINDA ROSENCRANCE

A small Edison, N.J., company that developed an online medical referral system has filed suit against shipping giant Federal Express Corp. to retain the right to use the worldontime.com domain name.

Dostana Enterprises LLC asked the U.S. District Court in New York on Feb. 2 to declare that its registration of the do-

main name doesn't violate federal laws designed to protect companies from outsiders registering a corporation's trademark as an Internet domain.

Memphis-based FedEx had asked Dostana to stop using the domain. Sally Davenport, a spokeswoman at FedEx, said FedEx is obligated to do everything in its power to safeguard the trademark. ■

Accessibility Resources

■ **HTML Writers Guild**

<http://www.awarecenter.com>

■ **World Wide Web Consortium**

Web Accessibility Initiative

<http://www.w3.org/WAI/>

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SHAREBASE • SQL/DS

SQL SERVER

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DB2/6000

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MODEL 204

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Novell Unveils Products In E-Commerce Push

iChain networks aim to link B-to-B partners

BY DOMINIQUE DECKMYN
SAN JOSE

USERS AND analysts hailed Novell Inc.'s move into business-to-business e-commerce last week, as the company formally introduced iChain.

The product, which is built on the company's Novell Directory Service (NDS) eDirectory, will create a flexible security structure that allows companies to give customers and

partners customized access to services. It will include tools to set fine-grained access policies for users and groups of users, delegate management and monitor bill usage.

That's "a beautiful thing," said Tim Morin, chairman of eSystems21 Inc. in Eden Prairie, Minn. Morin said he will use iChain to manage Wizmo, the company's application service provider aimed at small and midsize businesses.

With its iChain offering,

Novell joins a select group of online technology providers that includes IBM, Microsoft Corp. and iPlanet E-Commerce Solutions (formerly known as the Sun/Netscape Alliance), said Michael Hoch, an analyst at Aberdeen Group Inc. in Boston.

Also a Service

Novell will sell iChain as a packaged product, but the company and some of its partners also will offer it as a service. iChain will be rolled out to certain Novell partners in the next 60 days, with general

availability scheduled for later this year.

The release of iChain takes NDS, long established as an enterprise directory, outside of the corporate firewall — just days before Microsoft makes its belated entry into the directory market with Active Directory. At the launch, Novell executives outlined the company's Net Services strategy aimed at providing multiplatform, operating-system-neutral services for the Internet, intranets and extranets.

"I like that they are tying everything together around

AT A GLANCE

Net Services

Novell rolled out four products to provide online services.

iChain: e-commerce platform based on Novell NDS eDirectory

ZENworks for Networks: manages network equipment from Cisco Systems Inc., 3Com Corp., Lucent Technologies Inc. and others

ZENworks for Servers: manages servers, includes automated software updates for NetWare and Windows NT

EGuide: NDS-based online white pages

this one idea," said Hoch about Net Services.

Novell also announced last week that Stewart Nelson has been appointed chief operating officer, taking over day-to-day management from Chairman and CEO Eric Schmidt (see interview on page 28). ■

Training Mergers Continue

Market consolidation yields bigger vendors with broader product offerings

BY JULEKHA DASH

Two more high-tech training firms merged last week, continuing a consolidation trend that analysts say will yield bigger vendors with broader product lines for corporate trainers.

Last week, Pathlore Software Corp. in Columbus, Ohio, and Siltan-Bookman Systems Inc. in Cupertino, Calif., merged to form Pathlore Corp. The new company will offer both Web-based training software and instructor-led training software.

Last month, four training firms formed Knowledge Planet.com Inc. in Reston, Va., which now delivers online learning products for corporate users.

And last June, SmartForce acquired Knowledge Well Global Learning Systems in Vienna, Va. Redwood City, Calif.-based SmartForce, a major interactive training vendor, was formerly known as CBT Systems.

"We're seeing learning and multimedia [companies] move from mom-and-pop shops to more of an enterprise learning business," said Rick Zanotti, CEO of Relate Corp., a Pathlore reseller in Camarillo, Calif.

"The training industry is very fragmented. Most companies are less than \$50 million" in revenue, said Cushing Anderson, an analyst at International Data Corp. (IDC) in Framingham, Mass. But after merging, training companies can offer users a wider array of

services, Anderson said.

According to IDC, the worldwide information technology training market totaled almost \$19 billion last year and will reach nearly \$28 billion by 2003. Currently, IT training comprises 78% of the total training market.

Clark Aldrich, an analyst at Gartner Group Inc. in Stamford, Conn., said having fewer training vendors to choose from would make the selection process less confusing for users. "If I were buying, I'd rather have five choices than 45 choices," he said. ■

IBM Sues Informix on Patents

BY ROBIN ROBINSON

IBM has filed a lawsuit against Informix Corp. claiming the Menlo Park, Calif., company infringed on six IBM patents related to database software, distributed processing and data compression technologies.

IBM's patents, granted between 1981 and 1992, are for database servers, locking, referential constraint within a database and networking, according to the lawsuit filed Feb. 4 in U.S. District Court in Wilmington, Del.

But none of the eight Informix products listed as infringing on IBM's patents relates to the technology covered by those patents, said Michael Stonebraker, Informix's chief

technology officer.

An Informix front-end tool, with no locking capabilities or data compression, was listed in the lawsuit as infringing on IBM's patents for those technologies, said Stonebraker.

"These are our old servers. The new systems, they're not picking on them. If there's something they're trying to head off, they should go after our new products, not our old ones," Stonebraker said. "I don't get it."

It's "rare" for IBM to initiate lawsuits, said IBM spokeswoman Carol Makovich. The company is seeking treble damages and compensation for Informix's past use of the technologies. ■

IBM Cash Registers Come With Web Support

Devices expected to help retailers integrate channels

BY CAROL SLIWA

IBM last week unveiled a Web-enabled cash register that will help in-store employees gain access to customer data from all of the retailer's channels — whether brick-and-mortar, catalog or online.

The all-channel devices ultimately should help retailers improve customer service, sell merchandise not available in physical stores to in-store shoppers and even prevent fraud, IBM said.

For instance, checkout workers using IBM's new SurePOS machines could verify a credit-card holder's identity if the owner's photograph is on file.

Or, using the device's Web-enabled screen, employees could suggest and then show customers accessories related to their purchases, especially items that the brick-and-mortar store doesn't stock. Customers could order the items on the spot and select the desired method of delivery.

The point-of-sale devices can also help companies link

loyalty-program and merchandise-return systems, IBM said.

Karstadt, a major German retailer, is pilot-testing SurePOS machines, and an IBM official said two large U.S. retailers have expressed interest in the devices, which are expected to roll out in the next few months.

"This might be a wake-up call for a lot of people who are thinking about a clicks-and-mortar strategy," said Paul Farris, a professor at the University of Virginia's Darden Graduate School of Business Administration.

Companies that split off their dot-com operations — even to the point of offering different pricing schemes on the Web than they do in their stores — might rethink some of their decisions.

"It would be a hell of a lot harder to have two separate organizations running one cash register," Farris said. "I'm not saying you can't do it. But I'd want to go back to the drawing board and say, 'Is this going to work the way we thought it was going to work?'"

The SurePOS line features a Java-enabled Universal Serial Bus, which gives users a choice of printers, scanners and other peripherals. ■



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BRIEFS

Tax Stalemate Holds

The 19-member congressionally appointed Advisory Commission on Electronic Commerce remains undecided on tax proposals from a group of businesses led by America Online Inc. in Dulles, Va. Groups that included the National Conference of State Legislatures attacked the plan, saying it has loopholes and would hurt local tax bases.

Linux Share Rises

Linux cornered 25% of the server operating system market last year, according to preliminary data from International Data Corp. in Framingham, Mass.

But measured by revenue, Linux remains a tiny fraction of the market, with total revenue worldwide, on client and server combined, at a mere \$63 million. Windows NT's market share was flat at 38% last year, while NetWare reached 19% and all Unix versions combined held 15%.

IBM Deploys Siebel

IBM said it will globally deploy San Mateo, Calif.-based Siebel Systems Inc.'s customer relationship management applications for 55,000 of its employees, plus business partners and customers dealing with the company via the Internet.

Compaq's SAN Center

Compaq Computer Corp. said its storage-area networking (SAN) initiative with Marlboro, Mass.-based HighGround Systems Inc. will begin in the next two months. It has also started construction on the Storage Networking Technology Center with the Mountain View, Calif.-based Storage Networking Industry Association.

HP's SAN Investment

Meanwhile, Hewlett-Packard Co. will invest \$300 million in SAN integration centers in Atlanta and Cupertino, Calif. It will also test inter-operability between its products and other storage vendors' products. HP's SAN software program includes reseller agreements with IBM and Mountain View, Calif.-based Veritas Software Corp.

SAP Plans Upgrade for Apparel/Footwear App

Analyst: This may be software's last chance

BY CRAIG STEDMAN

SAP AG THIS spring plans to release an upgrade of its application software for apparel and footwear firms, a product that has caused big headaches for both the German vendor and its users.

Sources familiar with SAP's plans said Release 2.5 of the Apparel and Footwear Solution (AFS) will be built on top of a newer version of R/3 and include a redesigned user interface and beefed-up support for key business tasks such as allocating inventories to different retailers (see chart).

Bugs and other problems that cropped up in the software last year delayed many installations and caused at least four users to cancel their projects [News, July 12].

Now, nearly two years after AFS was released, big users such as VF Corp. and Reebok International Ltd. hope that the new features will finally give them an integrated set of applications that can fully replace their aging mainframe systems.

No Match

VF, a \$5.6 billion clothing maker in Greensboro, N.C., went live with the manufacturing and financial management portions of AFS at its jeanswear division two weeks ago. But it still isn't using the SAP software to process orders.

The jeanswear unit has "very sophisticated" home-grown order-management systems that AFS can't match today, said Leroy Allen, vice president of re-engineering at VF. Turning that job over to AFS now "would be stepping back a little bit and losing some functionality," he added.

Release 2.5 should have what VF needs to use all of AFS, Allen said. Rolling it out will take time, though: VF plans to start at its intimate-apparel division, but it doesn't expect to go live there until mid-2001 because of the need to integrate

AFS with add-on applications from several other vendors.

Reebok, a \$2.9 billion footwear maker in Stoughton, Mass., also doesn't plan to start using AFS to run its North American sneaker operations and most of its big European subsidiaries until next year.

The improved order-processing features due in Release 2.5 are just what Reebok has been waiting for, said Peter

Burrows, chief technology officer at the company. But Reebok first will upgrade several smaller operations that already are using AFS, he said.

SAP declined to comment about its plans, other than to say an announcement related to AFS is slated for April. Sources said Release 2.5 should be released for beta testing then and is targeted for shipment during the summer.

David Boulanger, an analyst at AMR Research Inc. in Boston, said AFS could still

A Lot Is Riding on SAP Data Warehouse Release

Users say they need features in 2.0 to scale

BY CRAIG STEDMAN

Most early users of SAP AG's data warehousing software have started small with their installations. But they have bigger plans in mind, as long as an upgrade that's now being beta-tested delivers on SAP's promises.

That's the landscape that will greet attendees in San Francisco this week at an SAP-run conference focused on the German vendor's Business Information Warehouse software. Users and analysts said a lot is riding on SAP's ability to deliver Release 2.0 of the warehousing technology.

For example, Fiammetta Hsu, a systems manager at SBC Communications Inc., said Release 2.0 could "really position us to move toward using [Business Information Warehouse] on a much larger scale" than the \$49 billion firm does now.

But it's still too early to say for sure, she said. SBC, a telephone and data communications behemoth in San Antonio, got the beta-test version of the data warehousing upgrade just last month and is still checking out what it has to offer. "In two or three months, we'll see how it goes," Hsu said.

SBC installed Business Information Warehouse last year

along with SAP's human resources software. About 100 workers in its finance department are using the warehousing software to prepare budget forecasts and reports on financial measurements such as worker productivity, Hsu said.

But SBC also had to write custom programs in SAP's notoriously complex procedural language so that some users could run reports directly against the transaction data in the human resources system. The first versions of Business Information Warehouse didn't provide access to that data — a feature that SAP has said will be added in Release 2.0.

Other new features due in Release 2.0, which is supposed to be ready for general release this quarter, include Web

JUST THE FACTS

SAP's AFS

Its history: Released two years ago, it caused early users problems with bugs and missing functionality. SAP formed a SWAT team to fix the problems after several projects were canceled last year.

What's next: A new release with improved support for product costing, inventory allocation and processing orders for multiple retail stores.

thrive in the market despite its "abysmal track record," because large apparel and footwear companies have few other software options.

But Release 2.5 could be SAP's last chance to make amends with users, he said.

"If they don't do it well, they may as well write AFS off," Boulanger said. ■

browser support and the ability to use third-party query and reporting tools to analyze data stored in Business Information Warehouse (see chart).

Until now, several analysts said, most installations of the warehousing software have been narrowly focused. "When people are implementing this, it's because they're looking for some very specific answers to business questions," said Joshua Greenbaum, an analyst at Enterprise Applications Consulting in Berkeley, Calif.

But Michael Bittner, an analyst at AMR Research Inc. in Boston, said Release 2.0 should be able to work as a full-fledged data warehouse if SAP delivers what it promised.

SAP users such as Steelcase Inc., a \$3 billion office furniture maker in Grand Rapids, Mich., have big plans for Business Information Warehouse. So far, Steelcase has written only a small departmental expense-reporting application that went live last fall. But Paul VandeVusse, director of application development, said the firm wants to use the warehousing software as an analytic foundation for its R/3 system.

"We've yet to put a massive amount of data into it, so we don't know how that will work," VandeVusse said. But the software can be used to quickly build and modify data marts to meet changing business needs, he added. ■

AT A GLANCE

SAP Data Warehousing

SAP's next data warehousing software release is supposed to add these features:

- Ability to read reports from Web browsers without downloading Java code
- Drill-down support for accessing detailed transaction data stored in R/3 systems
- Expanded querying functionality to fetch data from multiple information cubes
- Links to SAP's new Web-based user interface for launching all of its applications
- More prebuilt reports, information cubes and data extraction routines

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Users Still Hope for StorageTek Turnaround

BY KATHLEEN OHLSON

Despite Storage Technology Corp.'s poor financial showing, customer loyalty may keep it

alive, if not well, for the near future.

The Louisville, Colo.-based data storage equipment maker

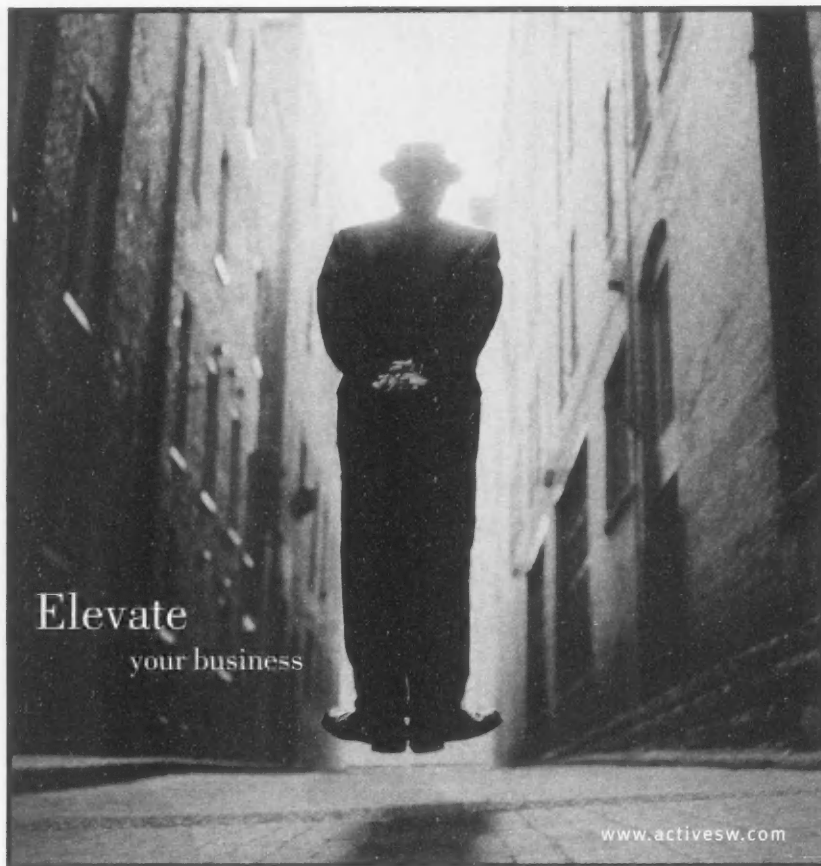
last week reported \$25.8 million in fourth-quarter losses, compared with \$52.6 million in profits for the fourth quarter of

1998. It posted \$74.6 million in losses for 1999, a major downturn from 1998, when StorageTek reported \$198.2 million in profits. It also warned that the losses will continue in this year's first quarter.

Despite StorageTek's woes, customers said they still believe in the company and its technology.

"I make my decisions based on the strength of the technology rather than the stock," said Dr. Robert Cecil, network director at the Cleveland Clinic in Ohio. The hospital has used StorageTek's products for more than 10 years and is currently using its 9840 tape drive, among others.

Users said they're pulling for StorageTek to survive because they don't want to be forced to use EMC Corp. and IBM products. Users have charged that those companies offer older tape and disk technology.



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StorageTek Grips

- Went beyond its expertise into consulting services that it can't support.

- Changed help desk methodology. Replaced live operators with an answering service.

Users said StorageTek's technology is its strength, but the company's product execution and its decision to diversify have contributed to its woes.

"It's poor in marketing," Cecil said. "They have the hottest tape around, but who would name it something like 9840?"

Another customer gripe is that the company is too quick to deploy leading-edge technologies in its products. Rich Ward, associate vice president of systems support at Keystone Mercy Health Plan in Philadelphia, said he sticks with proven StorageTek products because "their leading-edge technology tends to be bleeding edge." Ward said the vendor's tape libraries don't fully support Fibre Channel connections.

StorageTek also fumbled with its consulting service, according to Jerry Lynch, director of operations at the Online Computer Library Center Inc. in Dublin, Ohio. He said StorageTek moved into the service arena prematurely and then underfunded its expansion.

"I have faith they'll turn it around and get better direction at the top," Ward said. "Cats have nine lives, and the question is which one [StorageTek] is on now."



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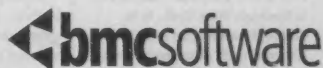


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BRIEFS

Microsoft to Force App Registration

Future buyers of Office 2000 will be forced to register their software, or it will refuse to run. Microsoft Corp., which hopes to combat software piracy, said users won't have to fill in their names or personal data.

Multisite Web Stats Package Near

In April, San Francisco-based Active Concepts Inc. will release an enterprise version of its Web statistics package, Funnel Web 3. The new version, code-named Mandella, will run on Solaris 8 and include multisite integration and streaming media tools.

Bank of America Names Internet Chief

Bank of America Corp. in Charlotte, N.C., has named James Dixon as its executive in charge of the company's new Internet business, Bank of America.com. Dixon will manage the bank's use of Internet technology, including its alliances with Yahoo Inc. and America Online Inc.

Short Takes

BE INC. in Menlo Park, Calif., has introduced a version of its BeOS, tailored for appliances. . . . PICAZO COMMUNICATIONS INC. in San Jose has demonstrated a Linux-based private branch exchange telephone server for small and midsize businesses. . . . A survey funded by BRIGHTWARE INC. in Novato, Calif., revealed that Fortune 100 companies are slow to respond to simple e-mail queries. But SEARS, ROEBUCK AND CO. won the top Swift-E award by answering a basic question in less than 10 minutes. BELL ATLANTIC CORP. placed second. IBM, INTEL CORP. and DELL COMPUTER CORP. were among those that never responded. . . . Chicago-based BUSINESS LOGIC CORP. will use JRules engine from ILOG INC., a French firm with U.S. headquarters in Mountain View, Calif., in its AccountLink software to establish different levels of customer service and Web personalization for online control of 401(k) investments.

Cisco to Provide Tech For Ford Supplier Net

As equity partner, will create connectivity kits to bring suppliers onto Auto-xchange

BY LEE COPELAND

LAST WEEK'S addition of San Jose-based Cisco Systems Inc. to Ford's Auto-xchange purchasing network will help tackle the technology challenges of getting suppliers and dealers to participate, analysts said.

Ford Motor Co. and Oracle Corp. brought Cisco into Auto-xchange as an equity partner. Cisco will create quick-start networking hardware and software connectivity kits for suppliers to connect to the business-to-business network. The amount of Cisco's stake in the project wasn't disclosed.

Michael Bruynesteyn at Prudential Securities Inc. in New York said getting auto suppliers onto Auto-xchange requires technology beyond basic Internet connectivity. He said having such technology in place could transform how automakers service customers in the next few years.

"The competitive advantage will arise when auto manufacturers use these exchanges for more in-depth communication

of manufacturing information and dynamic demand forecasting, and use them as an enabler of a 10- to 15-day build-to-order model," Bruynesteyn said.

Ford and Oracle announced the online trade exchange in November and began processing procurements earlier this month. Ford officials said five

of its biggest suppliers participated in a \$78 million auction of production parts that netted savings of at least 10%. Ford wouldn't name the suppliers.

Ford said it conducts \$80 billion in transactions annually with more than 30,000 suppliers and another \$300 billion in transactions with players in its extended supply chain.

The automaker would like its 6,900 automotive dealers to participate in the exchange. Officials said more than 200

Ford and Oracle employees are working on the joint venture.

Analyst David Garrity at Dresdner Kleinwort Benson LLC in New York said that while technology will play a significant part in Auto-xchange, signing on other automakers is important. "Technology does have to be there . . . but it's not a sufficient condition for success, because what matters in business-to-business e-commerce is scale and deriving revenues from economic activity taking place on these portals," Garrity said.

Oracle President Ray Lane said both Ford and Oracle were willing to dilute their corporate equity stakes in Auto-xchange to attract other major automakers and partners. ▀

Framework Software Links Project Teams

BY LEE COPELAND

Users looking to set up temporary Web sites as places where they can collaborate on projects are getting a boost with improved tools.

The latest release of Burlington, Mass.-based Framework Technologies Corp.'s extranet collaboration tool, ActiveProject v2000/E, lets users in disparate locations collaborate by sharing and storing documents. Pricing starts at \$85,495 for one server and 100 users.

Ken Johnson, Logan modernization program manager at the Massachusetts Port Authority in Boston, said the state

agency uses ActiveProject to assist design engineers who work together on expansion projects at Boston's Logan International Airport. The agency runs the collaboration tool on a Windows NT server on an extranet "to get out the latest information about projects and plans," said Johnson.

"Some of our consultants will take a digital photo of a problem, put it on site and can now come to a solution about it relatively quickly," he said.

Framework officials said the latest release can support more than 1,000 concurrent users on a single server, up

from 150 in its previous version. ActiveProject v2000/E, one of several Web-based project collaboration tools (see chart), supports Oracle Corp. databases and Microsoft Corp.'s SQL Server. Other enhancements include better document search, archiving and authoring capabilities.

Karl Cressman, senior computer-assisted design engineer at Harman-Motive, a division of Harman International Industries Inc. in Washington, said he's evaluating ActiveProject v2000/E and plans to launch a pilot program this spring. It will involve six engineers in three locations who will access the collaborative software from a Web browser.

With big demand from customers and little time for projects, "there's no time for hiccups," said Cressman. "We see this type of technology as a way to draw teams together and improve their communication." ▀

Standards Get Under Way for Even Faster Ethernet: 10G Bit

BY JAMES COPE

Seven major network vendors got together last week in Mountain View, Calif., and formally announced formation of the 10 Gigabit Ethernet Alliance. The group said its mission will be to promote this future and faster version of the Ethernet scheme for use in LANs, WANs and metropolitan-area networks.

Transporting data at 10G bit/sec. is a tenfold jump in speed over the Gigabit Ethernet that's just now going mainstream, according to the new alliance. But it's not just the ad-

ditional bandwidth that's impressive, said Clark Averill, a network support analyst at St. Luke's Regional Trauma Center in Duluth, Minn.

Global Standard

Ethernet is a global standard, and "it's easier to implement something you already know," said Averill. It's also cheaper than other network technologies like Asynchronous Transfer Mode, he added.

Averill said he's pleased that vendors are getting together to set standards. "Few users from the networking world get all of

their products from the same vendor, so interoperability is important," he said.

A spokesman from Santa Clara, Calif.-based 3Com Corp., one of the founders of the alliance, said it would be a couple years before the standards are ironed out and 10G-bit Ethernet hardware becomes available. And, unlike Gigabit Ethernet that can now run over copper wires, 10G-bit connections will have to be made over fiber-optic cables.

In addition to 3Com, the alliance's founding members are: Cisco Systems Inc. in San Jose; Extreme Networks Inc. in Santa Clara, Calif.; Intel Corp.; Sun Microsystems Inc.; Nortel Networks Corp. in Broomfield, Colo.; and World Wide Packets Inc. in Spokane, Wash. ▀

Other Web-based Project Tools

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Instinctive Technology Inc. Cambridge, Mass.	eRoom
Cephren Inc. Palo Alto, Calif.	ProjectNet

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FBI Issues Software to Help Detect Web Attacks

Firms advised to undertake code reviews

BY ANN HARRISON

THE FBI MAY NOT have gotten its man yet, but it has the code to save your site.

The FBI's National Infrastructure Protection Center (NIPC) has issued an alert (www.fbi.gov/nipc/ddos.htm) and software (www.fbi.gov/nipc/trinoo.htm) that can help systems administrators detect and repel the denial-of-service attacks that brought down seven Web sites last week. Both the NIPC and the Computer Emergency Response Team initially released versions of the alerts in December.

The FBI acknowledges that the software may not identify all the mutations of the attack that can change signatures. But security analysts say detecting attacks is an essential step in stopping the intrusions.

Greg Hawkins, CEO of Buy.com Inc. in Aliso Viejo, Calif., one of the sites invaded last week, said that once an attack was confirmed, its upstream service provider, Exodus Communications Inc. in Santa Clara, Calif., moved rapidly to shift traffic from overloaded border routers and restore service.

Distributed denial-of-service attacks use networks of master and slave machines created by attackers who insert malicious code into lightly defended computers. Crackers then used those machines to coordinate planned attacks, bombarding targets with large numbers of packets that block legitimate traffic.

According to David Remnitz, CEO of Ifsec LLC, a New York-based information security firm, the scripts provided by the FBI will also help systems managers determine whether their machines are being used as slaves to launch the attacks. "If you eliminate the slaves, the masters can't launch their code," explained Remnitz, who said slave ma-

chines feeding the attack have already been identified.

But tracing spoofed packets to attacking slave machines — and perhaps the attacker — will require tight coordination between government and private-sector systems managers, especially those at telecommunications companies and Internet service providers.

Remnitz said site managers need to monitor their bandwidth and the type of packets traversing their networks. That will help them determine whether they have detected the signature of a distributed denial-of-service attack or have computers that are unwittingly serving as slave machines. Attack signatures can be altered and packets spoofed.

Gary Grossman, director of security research and development at Exodus, said providers

need to look at how they handle customer access in and out of their networks. "There are well-known principles of filtering traffic from source addresses that don't actually come from within the network, and it's the lack of that kind of filtering that permits this kind of source-address

spoofing," said Grossman.

Remnitz noted that some intrusion-detection tools such as one from Network Flight Recorder Inc. in Woodbine, Md., can decode packets and signatures at high speeds as they attack a site. "But the vast majority of e-commerce companies don't have packages that can decode the signatures as fast as they flood the network," said Remnitz.

Jim Ransome, director of security architecture and operations at Pilot Network Services Inc. in Alameda, Calif., which provides secure hosting services for high-profile clients, including Peoplesoft Inc., CommerceOne Inc. and Newsweek, said Pilot halts nine or 10 denial-of-service attacks per week. "This is about business as usual," said Ransome.

Pilot uses a distributed security architecture and its Heuristic Defense Infrastructure to repel distributed de-

If you eliminate the slaves, the masters can't launch their code.

DAVID REMNITZ, CEO,
IFSEC LLC

Continued from page 1

Cyberattacks

times regular capacity and no one can sustain that," said Greg Hawkins, CEO of Buy.com Inc. in Aliso Viejo, Calif.

Hawkins said the attack, which came from multiple locations, overwhelmed the site's monitoring software, which scans for unusual traffic loads and blocks invasions from one IP address.

Department of Commerce Secretary William M. Daley warned that sites remain vulnerable. "There is no surefire defense," said Daley, who appealed to the computer industry to improve security monitoring and intrusion response to detect malicious code before it can do damage.

Investigators were expected to pursue the case over the weekend. On Friday, the University of California at Santa Barbara confirmed that one of its computers was used in the denial-of-service attacks.

The online assaults began Monday on Santa Clara-based Yahoo Inc.'s site, which was blasted with packet traffic at 1G byte/sec. — more than some Web sites receive in a year. The site was down for three hours. On Tuesday, San Jose-based eBay Inc., Seattle-based Amazon.com Inc., Buy.com and Atlanta-based CNN.com were hit with the same type of attack. Palo Alto, Calif.-based ETrade Group Inc. and San Francisco-based ZDNet Group were victims Wednesday.

Despite Daley's insistence that the attacks came without warning, the incidents followed a pattern of well-documented distributed denial-of-service attacks. In each case, sites have been targeted with a high volume of packets using falsified Internet addresses, which made the source of the attack hard to trace. Distributed denial-of-service attacks embed malicious code in weakly defended computers to create entire networks of master machines and subnetworks of slave machines (see story above).

Many of the attacks have targeted large Internet service providers and the hosts of the high-profile sites. Gary Grossman, director of security research and development at Santa Clara, Calif.-based Exodus Communications Inc., said this isn't the first denial-of-service attack directed toward his customers. Buy.com is an Exodus client.

"We host 40% of the major sites on the Internet, and so,

Prepare for An Attack

BEFORE

- Look for published operating system flaws
- Review third-party packages for weak links
- Read your logs
- Find good security engineers

AFTER

- Contact your ISP, the National Infrastructure Protection Center and local law enforcement

denial-of-service attacks, which Ransome said often topple conventional firewalls. He suggested that companies defending against such attacks conduct code reviews of their extranet environments to detect weak links created by common gateway interface code written in Perl, Visual Basic Script, Java or C scripts.

"We have to nip this in the bud. We need to find out where these slaves are installed, and it will take a real hands-on effort with systems administrators," said Remnitz. ■

statistically, we are going to see a good fraction of those," said Grossman. "It's not infrequent; it just means that we have to do more sophisticated analysis and have a wider range of addresses that we filter for."

But David Remnitz, CEO of Ifsec LLC, a New York-based information security firm, noted that this strategy works only up to a point. If the attackers shut off the original master hosts that are used in the attacks and assign false IP addresses to another set of attack hosts, the problem will continue. "I am basically chasing my tail if I put in filtering to identify the spoofed addresses but not [to] identify the culprit," said Remnitz.

Remnitz said government and private-sector cyberwarfare experts have known about distributed denial-of-service attack tools for almost a year. "We had 12 to 14 months for the tools to get out there and [be] built up," said Remnitz. "There could be a very large number of attacking hosts waiting to launch instructions." ■

Web Site Outages

Week of Feb. 7, 2000

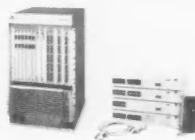
Monday:
Yahoo 11 a.m. to 1 p.m. PST

Tuesday:
Amazon.com 5 to 6 p.m. PST
Buy.com: 11 a.m. to 2 p.m. PST
eBay: 10:50 a.m. to 2 p.m. PST

Wednesday:
ETrade 5 a.m. to 7 p.m. PST
ZDNet: 4:15 to 6:45 a.m. PST
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HP Offers Online Billing Service

BY JAIKUMAR VIJAYAN

A new online service from Hewlett-Packard Co. promises to make it easier for application service providers to bill customers based on their actual service usage, rather than charge a flat fee.

The IP-Billing-on-Tap service, announced last week, is an online billing utility that HP claims will help Internet application service providers develop, price and provision new services — without having to invest in an Internet billing system themselves.

"Service providers basically get an [online] billing system that plugs into whatever service they are offering, monitors customer usage and bills customers," said Bruce Caldwell, an analyst at Dataquest in New York.

Vive la Différence

Such a capability is crucial at a time when a growing number of application service providers want to differentiate themselves by offering a variety of payment options based on the services customers actually use, Caldwell added.

For instance, BCE Nexxia, a division of Bell Canada, will use HP's service to introduce usage-sensitive pricing on some of its new Web hosting and Web server farm services, said Ken Gouveia, a director of service development at Nexxia in Toronto. Nexxia now charges flat rates for these services.

"We are outsourcing the billing to HP to add some capacity to our own billing capabilities," Gouveia said.

HP charges application service providers a base, up-front fee of \$25,000 to sign up for its service. It then takes a cut from the fees that each customer pays to the application service provider.

HP's service combines technologies from several vendors, including billing software from Portal Software Inc. in Cupertino, Calif., and payment services from Derivon Inc. in Atlanta. ■

Continued from page 1

E-Markets

ders and track shipments.

But this week, San Francisco-based ChemConnect Inc. and General Electric Aircraft Engines Co. will announce new features that address the issue, freeing users of massive systems integration headaches. Analysts expect other industry exchanges to follow, especially if they're to survive an inevitable shakeout among the thousands of digital bazaars springing up online.

ChemConnect and GE hope to make the back-end integration a differentiator to help attract suppliers and customers.

Until now, information technology managers at companies looking at online exchanges have faced an increasing number of choices, plus the challenge of integrating their in-house enterprise systems with that of the chosen exchange.

Without this integration, the Internet-based trades occur electronically. But recording the information about the transaction — commodities purchased, prices sold, deliveries scheduled — can turn into manual data-entry projects at both the buyer's and seller's ends. Potential cost savings for Internet transactions can get lost in time spent and data entry errors.

"The concern is there is going to be so many exchanges out there that you won't be able to see the forest through the trees," said Dror Liwer, chief technology officer at Context Integration Inc., an Internet services firm in Burlington, Mass., that develops online exchanges.

"If a company is going to build a [successful] marketplace, they have to make it as easy as possible to pull in buyers and suppliers," said Lara Abrams, an analyst at Aberdeen Group Inc. in Boston.

That means providing end-to-end electronic processing of transactions, from the time a trade is executed online until it's recorded in a buyer's and/or seller's in-house inventory and financial systems.

Under the new enterprise resource planning integration feature on ChemConnect's online World Chemical Exchange, users' inventory and accounting systems can be updated and shipping can be initiated as soon as a bid is accepted online. "Not only do we act as a hub or marketplace for buyers and sellers, we also act as a hub for connections. Every company just has to do one integration back to ChemConnect," said Linda Stegeman, vice president of marketing.

That feature appeals to Ann Benson, purchasing project manager at Life Technologies Inc. in Rockville, Md. Now, she said, Life Technologies does very little purchasing on the Internet exchanges, and one reason is the extra time and expense involved in rekeying data into in-house systems.

Along with other features, the back-end integration has attracted some industry heavyweights, including The Dow Chemical Co., Eastman Chemical Co. in Kingsport, Tenn., and BP Amoco PLC in London, which plans to move virtually all of its chemical business to online trading by year's end,

Water Trading Site Makes Its Debut

International water company Azurix Corp. has launched the site Water2Water.com to create an online water exchange and tap into what it estimates is a \$3 billion market in the Western U.S. But observers said the Houston-based company might also ignite a firestorm over water rights.

Unlike traders in other commodities, water traders have had no central exchange, said Ethan Cohen, an energy and Internet strategy analyst at The Yankee Group in Boston.

The industry has operated via "what we call the 'good of boy network,'" said David Pruner, senior vice president of resource development and management at Azurix.

Creating a water exchange is a timely idea, said Tom LaBerge, a consultant at Web business developer LaBerge and Co. in Portland, Ore. And with similar sites for natural gas and electricity already in operation, "people are used to this way of doing it," he said.

Via the Web site, buyers will be able to check prices "and maybe find out that somebody a couple of districts over is selling water for a lot less than" a district next door, Pruner said.

But the newly created market liquidity will push the issue of who owns water, LaBerge said. "Now, there are more rights than there is water," he noted.

"If water originates in the mountains of Colorado but empties into a valley in California, who owns the water?" Cohen asked. Such ownership issues "have not been hammered out in the courts, and no well-established precedents exist," he said.

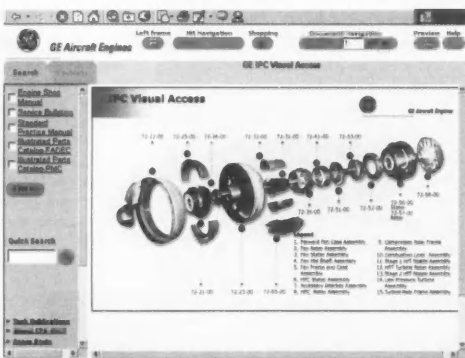
"As you put a price on [water], it'll motivate people to solve these problems," LaBerge said.

Market volatility will also encourage water district managers to use such an exchange, Cohen said. Buyers may shop for the best price but eschew low prices for better quality, he said.

Now in beta testing, the site will go live March 15. Bidders will be able to log on and enter the amount of water they want to buy or sell, along with their bid price. For example, a bid might be placed for 500 acre-feet of municipal water for \$225 per acre-foot. A buyer and seller will be matched, and then the buyer will be notified that he has bought 450 units at \$215 each from one district and 50 units at \$225 each from another.

The exchange has "real potential to speed the water-buying process," but more research needs to be done, said Scott Hamilton, resource planning manager at Paramount Farming Co. in Bakersfield, Calif. "The consequences of buying water and not having it delivered are enormous."

— Sami Lais



GE AIRCRAFT ENGINES' new customer Web center integrates systems that let users buy spare parts plus get technical information about them

according to John Robinson, a vice president at the BP Amoco chemicals group.

GE Aircraft Engines in Cincinnati aims to move its 300 customers to a new online customer Web center by linking user access to service and technical information with a system for purchasing parts from its 250,000-item database.

Thanks to a nine-month integration effort by a 40-person e-commerce team, corporate customers like Delta Air Lines Inc. in Atlanta can electronically place orders, check inventory, pay bills and view pictures of repairs being performed. They also can get technical manuals and service bulletins, which are "what drives the parts business in the aviation industry," said John Rosenfeld, e-commerce leader at the \$10 billion aircraft engine unit.

"Service bulletins drive the actions that airlines take to

maintain engines. Everything is determined off of these publications," which can take weeks to publish and distribute to customers, Rosenfeld said. By linking this data with the company's parts database, airline mechanics can determine the maintenance tasks they need to perform as well as order the parts to complete the task, in a single transaction at the online Web customer center.

"That means we'll shorten the cycle time from weeks to minutes," he said.

Looking ahead, GE's "plan is to integrate further with customers' systems to provide even greater value," said Rosenfeld. GE also would consider adding other manufacturers' parts and service bulletins to its site, thus creating yet another digital marketplace in the process.

"We are actively pursuing potential new opportunities," said Rosenfeld. ■

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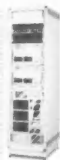
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Chase, Deloitte Start Procurement Firm

Partners enter business-to-business fray

BY CRAIG STEDMAN

OPENING another front in the effort of financial services firms to cash in on e-commerce, The Chase Manhattan Bank last week said it plans to team with Deloitte Consulting to form a new company that will target the online procurement market.

The new firm will offer Internet-based procurement services to Fortune 1,000 companies. Denis O'Leary, an executive vice president at Chase and head of the bank's Chase.com unit, said Chase and Deloitte expect to cut annual purchasing costs by an average of \$200 million to \$350 million for each client, in part by aggregating spending to get better volume discounts.

But many details of the new company still need to be determined, including its name. Chase and Deloitte are also still looking for a CEO for the joint venture, which plans to launch its procurement service by year's end.

Technology plans are unsettled as well. Chase and Deloitte, both based in New York, said the new company will work with any online procurement and enterprise resource planning applications. But the only software company on board now is Intelisys Electronic Commerce Inc., a New York procurement vendor in which Chase has invested.

Laurie Orlov, an analyst at Forrester Research Inc. in Cambridge, Mass., said procurement services should become a boom market as more companies look to automate their purchasing of office supplies, computers and other materials via the Web.

Users "have begun to realize that e-procurement is not just a snap-in [application]," Orlov said. "There's an awful lot to it." For example, she added, companies have to analyze their supplier base and try to

figure out how to get the biggest volume discounts.

But the Chase/Deloitte plan looks like a typical consulting program with the added enticement of Chase's payment-processing capabilities, Orlov said. "The only thing that

seems different is that it's going to be a dot-com company with stock options [for its employees]," she said.

Pierre Mitchell, an analyst at AMR Research Inc. in Boston, said he views the new firm as an arm's-length combination of Intelisys' software and Deloitte's consulting services. "And that coupling doesn't provide much value," he added.

CIOs Scoff at Report on the Demise of IT Departments

Analyst's view sparks debate

BY JULIA KING

Forrester Research Inc. gives information technology organizations three years before they're killed off by emerging e-commerce models that put technology management directly into the hands of business managers and outside service providers.

But CIOs just don't buy it.

Yes, they say, e-commerce is expanding. But they say it's increasing, not diminishing, companies' reliance on in-house IT departments.

J.R. Simplot Co. in Boise, Idaho, is a prime example. The 135-person IT group at the \$3.2 billion food company is developing PlanetAg, an Internet-based marketplace due to launch next month.

CIO Ray Sasso said Simplot will use PlanetAg to sell agricultural products online with complementary goods and services from other companies.

"When you give people online access to products and services, they need access to the status of orders, approvals and

other things in the back office," Sasso said. "That makes the really big challenge data management, and that can't be done by anybody but us, and that's just the ugly truth."

Similarly, the IT group at Ryder TRS Inc. in Denver built and maintains a business-to-business Internet-based "mini-exchange" for the 1,000 independent vendors that do maintenance on Ryder's trucks.

"That application was an IT initiative, and it was driven by IT as opposed to anyone else," said CIO Puneet Bhasin.

At Ryder, "IT is still very involved in application development — not just for legacy applications but for Web-based applications," said Bhasin.

In stark contrast, in a report this month titled "The Death of IT," Forrester foresees an explosion in outsourcing to "e-business networks — interdependent firms that link [companies'] business processes in real time over the Internet."

Additionally, Forrester says electronic businesses will increasingly disperse technology and its management from traditional IT departments to various business functions. As a

This is Chase's second attempt to break into online procurement. The company announced a teaming with Intelisys last fall, which was matched by similar arrangements between software vendors and financial services firms such as Wells Fargo & Co. in San Francisco and Merrill Lynch & Co. in New York.

Chase and Deloitte wouldn't say how much they plan to invest in their joint venture, but O'Leary said the companies will spend whatever it takes "to get this thing right. We both have substantial resources, and [funding] is not going to be an issue in making this succeed."

result, "the IT organization as we know it will disappear," according to Forrester analyst Bobby Cameron, who wrote the report.

As for current CIOs, the "enlightened" ones — about 10% to 15% — will move into such roles as chief operating officer or president, according to the report. But for the majority of reactive CIOs, "their future is with working with out-sourcers," Cameron said.

"I don't see that happening at all," said Brian Kilcourse, CIO at Long's Drug Stores Inc. in Walnut Creek, Calif.

Instead, Kilcourse said, IT departments may focus on infrastructure to support increasingly dispersed information exchanges. They will also dismantle groups organized around specific technologies.

"But at Long's, there continues to be a strong demand for strategic information systems," Kilcourse said. By definition, that usually means proprietary, in-house technology because "if someone else can buy the same thing, it can't be very strategic," he added.

Cameron said he isn't surprised by the CIOs' reactions. "Most CIOs I talked to don't see themselves going away," he said. Their chief financial officers do see them disappearing, he added.

In one recent Forrester survey of about 40 companies, CIOs reported that about 60% of all spending on e-commerce came out of the IT budget. E-commerce executives at the same companies said that only 5% or 6% of their technology spending came from the IT budget, Cameron said.

Service Set Up to Study E-Shoppers

Tools designed to mine Web click data

BY LINDA ROSENCRANCE

Blue Martini Software has launched a service for online merchants that analyzes Web site data to help increase revenue and retain customers.

The San Mateo, Calif.-based company, which makes applications for Internet-based stores to sell merchandise and provide customer service, said its subscription-based E-Business Intelligence Service will help merchants mine data about Web shoppers' behavior to discover business trends.

The service will then recommend certain actions to vendors, such as how to better target their merchandise, assess the accuracy of responses on registration forms and understand the types of consumers using their sites. The cost of the service depends on the volume of data analyzed.

'Depth and Breadth'

"This [service] just takes what Blue Martini does to another level. It gives more depth and breadth to their offerings," said Alan Alper, an analyst at Gomez Advisors Inc. in Lincoln, Mass.

Recently, Blue Martini analyzed the Web click-stream and purchase-transaction data for Gloss.com, an Internet-based beauty products retailer in San Francisco.

Armed with information on the demographics of registered users — which Blue Martini found wasn't representative of all users of the site — Gloss.com officials said they will be able to organize merchandise to create a more convenient and personalized shopping experience for consumers.

"The key thing for us is the ability to look at our users' buying patterns and what they are doing on our site, so that we can [determine] how to improve it," said Doug Dalton, chief technology officer at Gloss.com.



SIMPLOT CIO Ray Sasso: "[Data management] can't be done by anybody but us, and that's just the ugly truth"



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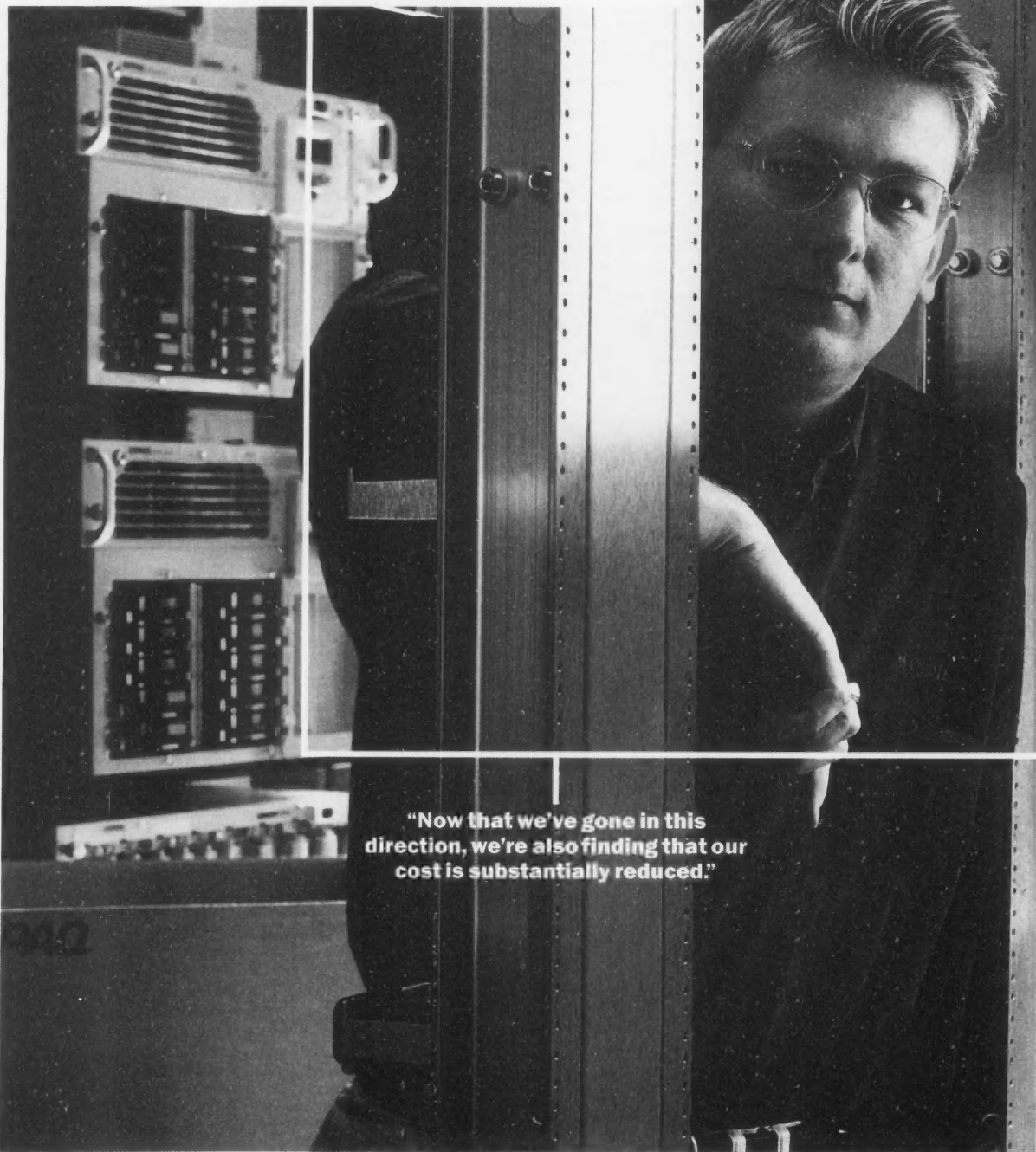
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FRONTLINE PARTNERSHIP

Developers Cool on Inprise/Corel Merger

BY KATHLEEN OHLSON
AND LEE COPELAND

The biggest losers in last week's merger of Corel Corp.

and Inprise Corp. could be the Windows application developers and programmers who use Inprise's products.

Ottawa-based Corel nabbed Inprise for \$2.44 billion in stock, taking aim at the hot Linux market. Corel CEO Michael

Cowpland said the new company will focus primarily on Linux, but "Windows will continue to be a cash cow."

However, analysts said Inprise JBuilder and Delphi users won't like being the financial

springboard for Corel's Linux strategy. "Corel blew [Inprise Windows users] off by referring to them as a cash cow. Most programmers won't take kindly to the idea of being milked," said Carl Zetie, an analyst at Giga Information Group Inc. in Santa Clara, Calif.

JBuilder developer Kirk Kness, assistant vice president of architecture and technology at T. Rowe Price Associates Inc. in Baltimore, questioned whether Corel would continue to put development dollars behind non-Linux tools.

"Do I think the acquisition by Corel is a good thing for them? Yes. But is it a good thing for existing customers not doing Linux? Maybe not," he said. "We're not using Linux. It appears that they are shifting their existing resources to Linux and [are] not focused on keeping the shop lights on."

But this isn't the first time users have been forgotten by Inprise. The Scotts Valley, Calif.-based development tool and middleware company has moved away from its traditional core of developers and desktop end users to enterprises in the past two years.

According to Inprise, there are 250,000 JBuilder license holders and 1 million Delphi license holders.

Analysts said Inprise users are loyal to the products, but the market hasn't responded. Inprise's Delphi is superior to Microsoft Corp.'s Visual Basic but lost the branding game to its formidable foe, they said.

"Delphi users may have to swallow hard and acknowledge Microsoft owns the space," and move to Visual Basic, said John Rymer, an analyst at Upstream Consulting in Emeryville, Calif. ▀

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JUST THE FACTS

Corel/Inprise Merger

■ Corel, an Ottawa-based software developer, is taking aim at the Linux operating system market. Inprise, in Scotts Valley, Calif., is an Internet access and application development software firm, formerly Borland International Inc.

■ In a deal announced Feb. 7, Corel will acquire Inprise for \$2.44 billion in stock.

■ Inprise will operate as a subsidiary.

■ Corel CEO Michael Cowpland will remain at the helm of the merged company.

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Online This Week

Windows 2000: New, improved

Windows 2000 has universal appeal. Designed as the platform for distributed enterprise applications, Windows 2000 gives end users the power and flexibility to manage their systems — from the smallest to the largest network — securely, reliably and seamlessly.

Virtual processing features

Windows 2000 offers many features designed to support virtual processing. These features plus third-party software can be combined to enhance availability, scalability, performance and even system or network administration. Windows 2000 Advantage columnist Dan Kusnetzky, an analyst at IDC, takes a look.

Windows 2000 users sound off

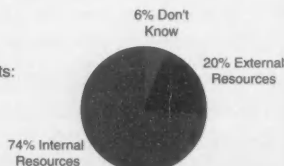
Compaq recently hosted a Windows 2000 Academy in Rocky Hill, Conn., for key customers migrating to the new operating system. The academy provided attendees with the opportunity to spend an intense week learning about and working with Windows 2000.

Quickpoll Do you expect to rely primarily on internal (IT staff) or external (consultants, other third-party services) resources when you implement Windows 2000?

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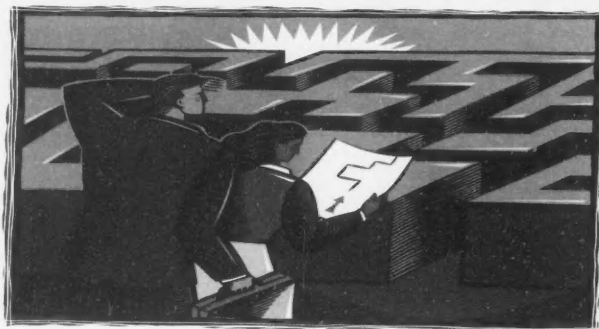
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Windows 2000



Clustering helps users pick path to scalability

Multidimensional scaling added to Windows 2000

By Elisabeth Putnam

At 3M, e-commerce traffic is on the rise and the move to ERP applications is ratcheting up the workload on servers. As a result, for 3M Co.'s IT department, "Scalability is an ever-recurring issue," says Darold Anderson, systems analyst at the Minneapolis manufacturer.

Like many leading-edge Fortune 500 firms, 3M plans to implement a new server architecture this year based on Microsoft's Windows 2000 and 8-Way SMP boxes based on the Profusion chipset co-developed by Compaq and Intel subsidiary Corollary. Compaq became the first vendor to ship a product based on the new chipset last August, with the introduction of its ProLiant 8000 and 8500.

Anderson and his colleagues are confident that the new server platform will scale to meet 3M's needs well into the new millennium.

"Up until a couple of years ago, I'd say Unix/Risc systems were more scalable," says Anderson. "But Windows 2000 running on the Corollary architecture — I'd say they've pretty much proven that it takes scalability to a new level."

Indeed, Microsoft and Compaq have made Windows 2000 and the 8-Way ProLiant into a powerful combination that offers customers two complementary and synergistic strategies for adding capacity: scaling up and scaling out. Scaling up increases the horsepower of a single machine by expanding main memory and adding processors to the SMP array. Scaling out involves intelligent load balancing across a cluster of servers and adding new servers to the cluster as workload increases.

Recent benchmark tests found that Compaq 8-Way ProLiant 8000 and 8500

servers running NT 4.0 Enterprise Edition performed at least 60% faster than the fastest 4-Way machines on the market. That's not surprising considering the powerful new features incorporated into the new server platforms. First, they incorporate an eight-processor rather than a four-processor SMP array. They also eliminate the bottleneck potential of their predecessors by using 100-MHz rather than 33-MHz buses to the main memory and to the I/O subsystem.

Compaq's 8-Way servers also benchmarked higher than Risc/Unix platforms.

During a benchmark using SAP, a ProLiant 8500 running NT 4.0 pumped through 3.18 million sales line item transactions in an hour, beating the previous record of 2.14 million transactions held by Sun's Ultra Enterprise 10,000 server with 12 processors. ▀

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Compaq customers: On the fast track to Windows 2000

By Deborah S. Cooper

Compaq customers are apparently on a slightly faster migration track to Windows 2000 adoption than customers of some of its competitors. While IBM's global services suggests that its large customers may take a year to make the transition, at least 53% of Compaq customers polled at Comdex/Fall '99 say they plan to migrate within six months. An additional 36% said they'll migrate within 12 months.

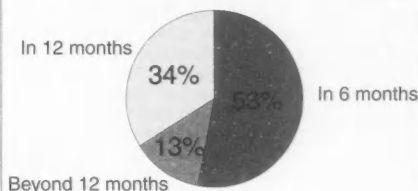
These results are based on questions asked of new subscribers to Windows 2000 Advantage. The free webzine, which now has more than 15,000 subscribers, asked some basic questions of potential subscribers. Of the more than 1,270 who responded, 75% were Windows NT users. Of those already using Compaq solutions and services, 50% used its desktop products, 31% its portables and 46% its servers.

Analysts aren't surprised by this potentially faster adoption rate of Windows 2000 by Compaq customers. "It makes sense that Compaq is a little out in front of its competitors," says Laurie McCabe, senior analyst and consultant at Boston-based Summit Strategies.

"Compaq was an adopter of Windows NT from the get-go, helping make NT a business standard. It therefore has a long, loyal relationship with Microsoft and it now ups the ante with Windows 2000," she says.

McCabe believes the investment Com-

When will you
migrate to Windows 2000?



Base: 906 Compaq customers

paq has made in helping make NT the industry standard as well as its longstanding relationship with Microsoft are factors that will raise the comfort level of Compaq customers migrating to Windows 2000. She calls desktop migration a "done deal" and expects a quick, easy rollout.

While the timetable for server migration is a little more tentative, she predicts that because Compaq servers have a long and good track record, server customers will more likely migrate to Windows 2000 than to other server products from Linux distributors and Sun.

Dwight Davis, also an analyst at Summit Strategies, says the success of Windows 2000 server adoption will depend on whether problems surface after launch.

But because there's been so much internal testing at Compaq and so many beta disks distributed, he doesn't foresee the raising of red flags and expects "a healthy rollout right after launch." ▀

To read the full text of this story, visit www.Windows2000Advantage.com.

The Web Magazine for IT Leaders Implementing Windows NT and Windows 2000 with Compaq Services and Solutions

Point of View

Compaq targets telecom market with new division

The telecommunications industry is converging, and Compaq is anticipating the changes. As a result, the company has formed a new telecommunications line of business, Compaq Telecommunications, which will concentrate on developing convergent solutions across a range of market segments. These solutions will address issues such as wireless vs. wireline, voice vs. data and traditional switched networks vs. the Internet.

Compaq first unveiled its telecommunications plan at Telecom '99 in Geneva last fall. Although many of the details are yet to unfold, Enrico Pesatori, senior vice president and group general manager in Compaq's enterprise solutions and services group, announced that the newly formed Compaq Telecommunications will be headquartered near Dallas, with operations worldwide.

Larry S. Schwartz is president and general manager of Compaq Telecommunications. Schwartz was formerly vice president and general manager of Compaq Telecom Network Solutions.

Specifically, Compaq

is asserting itself in the telecom marketplace by helping to optimize Windows 2000 for new customer implementations at large telecom carriers, wireless network providers, cable TV companies, Internet service providers (ISP) and application server providers (ASP).

Initially, Windows 2000 is expected to be used heavily by ISPs, many of whom are already Windows NT users. To better serve these customers, Compaq is working to provide enhanced scalability by building systems around ProLiant eight-way symmetrical multi-processing servers.

Windows 2000 is also a promising environment for emerging ASPs, predicts Keith McAuliffe, vice president of Compaq's service provider business unit. "A lot of the ISPs are looking to extended their value propositions to customers through hosted applications," says McAuliffe. He adds that ASPs are attracted by Windows 2000's improved reliability and uptime. ▀

To read the full text of this story, visit www.Windows2000Advantage.com.

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For more inside, hands-on Windows 2000 information, go to www.Windows2000Advantage.com

GO

BRIEFS

Cisco Profits Triple

Cisco Systems Inc. last week reported net income of \$825 million for the quarter ended Jan. 29, almost triple the income from the same period a year ago. San Jose-based Cisco posted net sales of \$4.35 billion for the quarter, an increase of 53% from the \$2.85 billion it reported for the same period last year. (See related story, page 89.)

Baan to Sell Coda Unit

Baan Co., which is trying to recover from six consecutive quarters of losses, last week announced a deal to sell its Coda accounting software unit to U.K.-based Science Systems PLC for \$50 million in cash. Netherlands-based Baan said it expects a financial gain of about \$30 million from the sale, which is scheduled to be completed next month.

Kana, Silknet to Merge in \$4.2B Deal

Kana Communications Inc. in Redwood City, Calif., and Silknet Software Inc. in Manchester, N.H., last week announced an agreement to merge in a deal valued at \$4.2 billion. The companies said the merger will combine Kana's online customer communications offerings with Silknet's e-commerce systems.

Sun Buys Security

Sun Microsystems Inc. has acquired Trustbase Ltd. in London for an undisclosed sum. Trustbase's subsidiary, JCP Computer Services Ltd., is a developer of public-key-infrastructure-enabling technology. Sun will integrate JCP's technology with its iPlanet e-commerce suite.

HP to Provide Servers

Hewlett-Packard Co. and Loudcloud Inc. in Sunnyvale, Calif., last week announced that they're working together to help high-growth Internet businesses get to market and scale faster. Loudcloud, which builds and runs Smart Cloud software services for Internet businesses, has tapped HP to be its preferred provider of Intel-based Windows NT and Linux servers.

\$2.8B Deal to Speed Delivery Of Audio, Video Over Web

Akamai, known for speeding Web page response time by caching, adds to stable

BY JAIKUMAR VIJAYAN

AKAMAI Technologies Inc.'s proposed \$2.8 billion purchase of potential rival Intervu Inc. should help bolster the company's position as one of the leading providers of Internet content delivery services, analysts said.

Cambridge, Mass.-based Akamai last week said it would acquire Intervu in an all-stock transaction. Intervu is a San Diego-based provider of Internet audio and video delivery services.

The proposed purchase comes less than a month after Akamai's \$200 million purchase of Network24 Communications Inc., a Cupertino, Calif.-based vendor that helps companies add video and audio content to their Web sites.

The moves should help Akamai offer a wide-ranging portfolio of services, from data, audio and video delivery to production, broadcasting and audience-management services, said Jami Axelrod, a product manager at the company.

Though it closed last year with fourth-quarter revenue of just \$2.6 million and accumulated losses of more than \$30 million, Akamai's market valuation early this month was more than \$20 billion. Its list of more than 200 customers includes CBS Corp. in New York, CNN Interactive in Atlanta, Yahoo Inc. in Santa Clara, Calif., J. C. Penney Co. in Plano, Texas, and Britannica.com Inc. in Chicago.

Much of the investor and customer confidence stems from a patent-pending Akamai technology that speeds up Internet content delivery by routing and caching frequently

accessed and static data.

On typical Web sites, all the components that make up a Web page are stored on the home site's server and must be transmitted over the network each time a page is requested. Akamai's technology allows site owners to use a form of caching to store much of the static information, such as logos and graphics, on Akamai servers in networks around the world. Thus when a user requests a page from a Web site, the various static components on the page are pulled together from servers as efficiently as possible.

"It's a really excellent technology. Download times have been reduced drastically," from more than 12 sec. to less than 4 sec. per page, said Camille Currim, vice president of systems at New York-based iVillage Inc., an Akamai customer.

The Intervu purchase will allow Akamai to offer the same kind of services with audio and video content, too, said Brendan Hannigan, an analyst at

AT A GLANCE

Akamai

What does Akamai mean? It's Hawaiian for clever or "cool"

What does it do? Helps Web site owners speed up delivery of content to end users

Who founded it? A group of professors and graduate students from MIT

How long has it been in business? Incorporated in August 1998; started operations in April 1999

Who are its customers? They include Apple Computer Inc., CBS, Britannica.com, Monster.com, iVillage.com, J. C. Penney

Forrester Research Inc. in Cambridge, Mass.

"Akamai has done a good job of basically creating a new service category in many ways," said Joe Laszlo, an analyst at Jupiter Communications Inc. in New York.

Along with San Francisco-based Digital Island Inc., Akamai has been a leader in addressing problems created by the growing Internet congestion and sudden spikes in Internet traffic, Laszlo added. ▀

New Novell COO Looks Forward to Win 2k Launch

Will compare Active Directory with NDS

BY DOMINIQUE DECKMYN

Recently appointed Chief Operating Officer **Stewart Nelson** is taking over day-to-day management of Novell Inc. at a particularly challenging time — only days before Microsoft Corp. rolls out Windows 2000 and Active Directory and in the midst of a surge in interest in the upstart Linux operating system.

Nelson, formerly senior vice president of products and marketing, joined Intel when it acquired WordPerfect Corp. in 1994. He spoke to *Computerworld* at last week's launch of four key new products.

Q. You've been credited with getting a long stream of new products out the door. What did you do?

A. Well, it's called focus. I think when [Chairman and CEO] Eric [Schmidt] came on board, we were doing too many things. And the first thing we did was look at what made sense for Novell [and] what were our core competencies. And we marshaled our entire company and our entire R&D organization towards those goals. And what my [new] job really is is to do that companywide. We're focusing on being a Net services software company, on becoming part of the fabric of the Net.



STEWART NELSON: "Active Directory not shipping is hurting us"

Q. Eric Schmidt today referred to Active Directory as "the directory that isn't shipping." That won't be true for very long.

A. Thank goodness. We want Active Directory to ship. Active Directory not shipping is hurting us. The first thing that I'm going to do is to put together a road show and go out to all the major accounts and start doing demonstrations with [Novell Directory Services] and Active Directory side by side.

Q. Are you disappointed by the extent to which Novell leveraged those years when it had the directory space almost to itself?

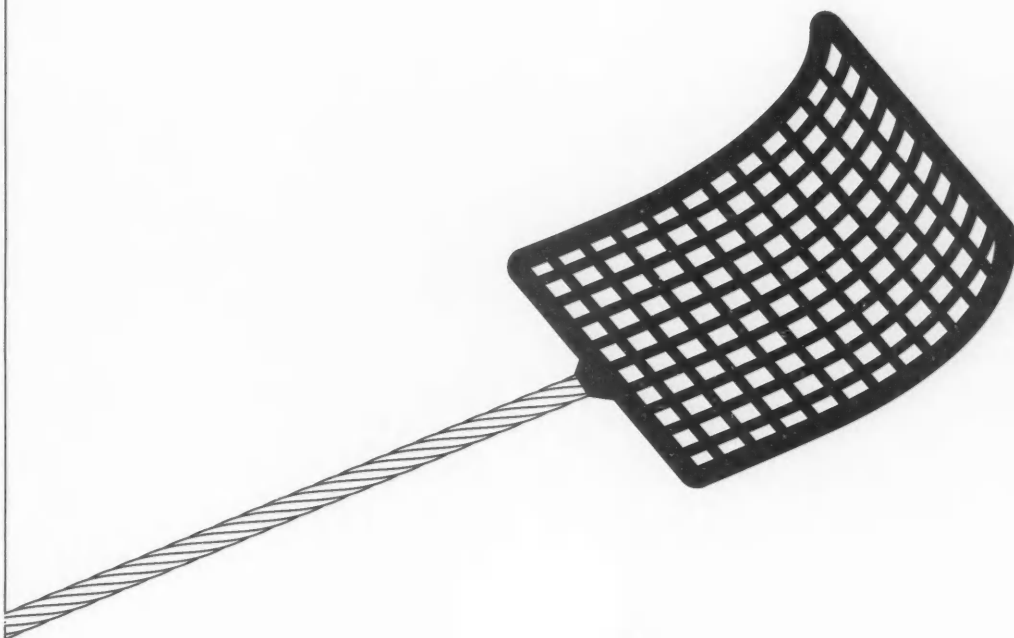
A. We have 50 million users of our directory. So you kind of have to put that in perspective. That's not a huge failure, if you know what I mean. Most companies would die for that kind of a

user base for any product. So, do I wish it were more? Yeah. Am I going to make it more? We're going to double, triple and quadruple it pretty quickly as we start moving into the Net. But I'm not disappointed with where we are. I am disappointed that we haven't been able to articulate the directory strategy better.

Q. Recent market numbers from International Data Corp. suggest that we're seeing NT and Linux grow fast but that Unix and NetWare appear to be rather flat. Do you feel you're being sandwiched between NT and Linux?

A. No, I don't. No, I, we're not flat. Look at our financial statements for the last three quarters. The fact that the world is going more and more heterogeneous is good for Novell. People are going to run Linux, Solaris, NetWare 4, NetWare 5; they're going to run NT and Windows 2000. Our strategy is to come in and tie all that chaos together. ▀

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MARK HALL

Tough neighborhood

MY FIRST JOB IN JOURNALISM was for a low-rent publisher on First and Howard in San Francisco, just two blocks east of the Moscone Center, where later this week Microsoft will stage its anticlimactic unveiling of Windows 2000. When I first worked there in the early 1980s, Moscone wasn't part of the Yerba Buena Gardens, an urban jewel for which the city today is rightly proud. Back then, it was a

lone structure in a bad neighborhood that attracted more vandals and graffiti artists than marketers and programmers.

These days, the roughest neighborhood I know of is online.

If you do business on the Web, it seems you're an automatic target for cybervandals. There's been a load of speculation about the motives behind a series of denial-of-service attacks on popular sites like Amazon.com, Buy.com, eBay and Yahoo. But whether the reason stems from some deeply held contempt for commerce or just some punks on a URL joyride, the lesson for you is the same: Make sure your site is secure.

Some of you may think you have already done so. Or maybe you got assurances from your service provider that it's done all it can to prevent network intrusions. Check again.

As our Ann Harrison first reported online



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last week and now on Page One, denial-of-service attacks are neither new nor a surprise. One service provider told Harrison that it has deflected nine or 10 similar attacks each week this year. You haven't seen its clients' woes in the headlines because the site expected such attacks and prepared for them.

That kind of security costs extra. But downtime costs much more in the long run. So, if your e-business truly requires 24/7 service, why would you put your site in a location where bullies roam free and chase away your customers?

To make Moscone thrive as it now does as an international conference center, San Francisco made a huge investment to dramatically improve the neighborhood. Service providers had better be ready to make their haunts safe and secure as well. ■

READERS' LETTERS

Net taxation rebuttal

STEPHEN RICHARD Levine states in his letter about Internet taxation [News Opinion, Jan. 24], "Why do I owe your locality anything if I do not receive any tangible benefit?" If I order something and then refuse to pay for it, how does the seller collect? He can sue me either in my locality or in his. If he sues me in mine, then he's benefiting from my local government. If he sues me in his, then he can collect only if my local government enforces his locality's judgment, and he's again benefiting from my local government.

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Pay-as-you-go model not new to Microsoft

IN "A Vital Year for Microsoft" [Page One, Jan. 24], Kim S. Nash writes, "The most valuable company in the world got that way by selling prepackaged software. The concept of pay-as-you-use subscriptions is 'a very, very different model' from what Microsoft is used to, said Dwight Davis, an analyst at Summit Strategies Inc. in Seattle."

Bill Gates was championing the partitioning of what became his office applications before Windows 3.x hit the market. He pointed out that most of the power in office automation software is never used by any one person, yet they have to pay for it. He wanted to sell a core product at a low price and then let users buy the add-ins as needed for a small additional fee.

Fast-forward to 1993. The COM 2.0 specification established a framework to facilitate component software, which is

an integral part of this strategy. "Network aware" COM would extend this model across an office. Now, with Windows 2000 integrating COM+ into the operating systems, the Internet becomes a service provider. It reduces Microsoft's packaging and delivery costs.

In short, Microsoft is more than ready for the hosted application's pay-as-you-go marketing model. Bill Gates was moving in that direction before most of your writers were in college.

John Pittaway
J&K Software Solutions
Santa Ana, Calif.
jpittawa@pacbell.net

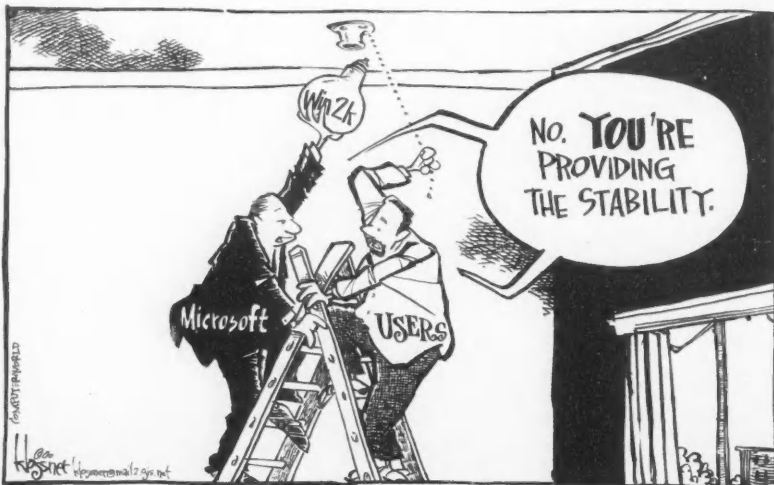
Security still an issue

IHAVE TO disagree with Frank Hayes on CD Universe spending our tax dollars to fix its security problem ["Wanted: Security Champion," The Back Page, Jan. 17]. He basically called it a "hapless jerk" for allowing the security hole to remain in its system. If a window in my house is wide open, it is still illegal for someone to come in and steal my property.

Yes, we need to protect our systems, but hackers will almost always be able to get through whatever walls we build. I think we need to find a different approach to addressing the issue rather than require everyone to hide behind as high and thick walls as possible.

Andy Wenzel
Miami Lakes, Fla.

COMPUTERWORLD welcomes comments from its readers. Letters shouldn't exceed 200 words and should be addressed to Jamie Eckle, letters editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax: (508) 879-4843. Internet: letters@computerworld.com. Include an address and phone number for immediate verification.



DAVID MOSCHELLA

Windows 2000 isn't the future of computing ...

TEN YEARS FROM NOW, what will historians say about the impact of Windows 2000? Will this huge operating system initiative be seen as yet another great Microsoft and Intel triumph, completing the expansion of Intel from the desktop into the highest echelons of corporate computing? Or will this renamed Windows NT be viewed as the last big gasp of an outdated form of computing — a massive, but ultimately hopeless, struggle against an increasingly Web-driven world?

Although actual product destinies are rarely so black and white, market competition usually does produce a clear verdict, or at least a dominant trend. Probably the least likely scenario is that Microsoft will achieve all of its goals for Windows 2000 and that believers in an increasingly application services-driven paradigm will achieve all of theirs. Even in today's vast IT industry, it will be increasingly hard to find room for both approaches. Eventually, something will give.

There is, of course, an important time dimension to all of this. Had Windows 2000 arrived 18 months ago, perhaps Linux and the whole open-source movement would never have become more than an interesting offbeat idea. On the other hand, were Windows 2000 to be delayed another 18 months, surely many customers would choose to look elsewhere. But right now, it looks like we're in for a pretty fair fight. There's plenty of talent, money and opportunity on both sides.

My own view, however, is that Microsoft will increasingly find itself swimming against the tide. Ever since the arrival of the minicomputer in the 1960s, there has been a natural and healthy competition between the capabilities of centralized and distributed systems. The PC represented the high-water mark of the latter; the Web symbolizes the resurgence of the former. The combination of order-of-magnitude leaps in bandwidth, the open-source movement and the economics of a billion-user Web will inevitably position Windows 2000 as part of an increasingly obsolete order.



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More specifically, I believe that the proliferation of small businesses, the outsourcing of e-mail and the spread of Web hosting will help turn customers away from running their own servers. The Internet will help launch millions of new businesses all around the world; these companies will find it relatively easy to skip most of the Wintel server experience and go straight to application service providers.

E-mail outsourcing will lead the way. Once application service providers round out their messaging service offerings, and once the Web gets consistently fast enough, running your own e-mail system will be largely a waste of time. And once e-mail goes, so will discussion groups, knowledge bases, document distribution and, eventually, most forms of text-based computing, including voice/text integration.

Similarly, the unstoppable shift toward outsourced Web site hosting will drive application service provider usage on the data side of the house. Customers won't care and may not even know which operating system their service provider is using. Additionally, these service providers will, at least in theory, be well equipped to assess the various virtues of Windows 2000, Linux, Solaris et al., resulting in real operating system competition based on features and pricing.

This pattern will inevitably spread to larger organizations. However, this doesn't mean that businesses of all sizes won't or shouldn't aggressively adopt Windows 2000 today. There are many environments where this will make perfect sense, or even be necessary. My only caution is that, despite all the hype, companies should view Windows 2000 as mostly a tactical implementation, not a long-term strategic direction. The future of computing lies elsewhere. ■

ALLAN E. ALTER

... but in the present, top execs will be watching

WITH Y2K MOSTLY behind us, e-commerce work before us and postponed IT projects pressing to the fore, this week's arrival of Windows 2000 hardly looks like a barn-burner issue — especially outside the halls of IT. To a CEO, a chief operating officer or a marketing vice president, upgrading from Windows NT 4.0 or switching from Unix doesn't look terribly strategic: It won't help build a brand, boost market share or grow your e-business. The alleged advantages of Windows 2000 — fewer crashes, greater scalability,

better security — aren't the stuff of annual reports and Wall Street briefings.

But I suspect that top management will be paying attention to what you do about Windows 2000 — not to the software itself, but to how IT handles the upgrade.



ALLAN E. ALTER is editor in chief of the MIT Sloan Management Review and a former Computerworld editor. Contact him at alter@mit.edu.

I'll bet that executives will wonder if IT has learned anything from the Y2k experience. Will the organization put to use any of the new project-management techniques it has honed? Maybe it's a good idea to create a Windows 2000 project

office similar to your Y2k project office, maybe not. The point is, it will seem odd if nothing from the Y2k experience carries over to your Windows 2000 work.

Your chief financial officer will want to see if IT management grasps the full fiscal consequences of moving to Windows 2000. Will IT once again cost the company big bucks because of some overlooked detail? Don't expect your CFO to smile if you can't speak intelligently about the upgrade's impact on the balance sheet in light of SOP 98-1, the change in accounting principles regarding computer software. And if you can't address the total cost of ownership issues, you can expect to be heaved out a window.

Can your IT leadership place a move to Windows 2000 in a broader business context? Executives will ask you what this means for e-commerce and your company's most important applications, and how this will affect business goals. Chatting up speeds and feeds won't win you any brownie points.

Has your group considered the alternatives to Win 2k? Even the most benighted of managers have heard of Unix and Linux, and they'll wonder if either of these would provide a better platform for the company. They may also want to know if moving to Windows 2000 would create or remove any outsourcing opportunities, or opportunities to use application service providers.

They won't just want intelligent answers; they'll want answers that respect their intelligence. Most real-life bosses aren't as dense as Dilbert's — we just like to pretend they are.

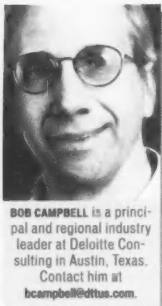
Remember this: The business world isn't what it was before Y2k and the arrival of e-commerce. Business executives are more curious, enthusiastic and knowledgeable about technology, and also more wary of technology's hidden costs and jack-in-the-box surprises. The glass house has never been more transparent than it is now; keep that in mind when you consider moving to Windows 2000. ■

BOB CAMPBELL

Government needs better Net approach, results

IN RECENT YEARS, I've heard many political candidates declare, "If elected, I'm going to run this government like a business." But what have the results been? Many states claim to have adopted corporate re-engineering techniques that will transform their operations. The objectives are to improve service to the states' customers — citizens and businesses — and to cut costs. At best, these experiments have met with mixed results.

We all know that a major constraint to transforming state governments is that they use outdated information systems. In many agencies, information systems are 10, 20 or even 30 years old — built on obsolete computers using obsolete programming languages. Agencies are isolated, each with its own policies, processes and data definitions. As a result, citizens needing service have to go to multiple places, wait in multiple lines and answer similar questions multiple times. Differences in technical environments across agencies prevent sharing



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and comparing of information to reduce redundant effort, identify fraud and streamline service.

The Internet is changing all that. Just as business is transforming its approach to customer care through the Internet, so is e-government. There are places today where citizens can register a vehicle, apply for a job, renew a driver's license or pay their taxes over the Internet. Citizens now expect a level of service from government that's similar to what they get in the private sector. And why not? Drive-through dry cleaners and drugstores, 30-minutes-or-less pizza delivery services and online shopping and banking have raised the bar for the speed and quality of customer service.

But just as they did when they first built information systems decades ago, many state agencies are developing Internet systems independently of one another. As a result, citizens must go to multiple Web sites to obtain similar information. Wait times are growing longer as limitations in capacity constrain access. And differences in technology architectures are again limiting information sharing among agencies. The same old constraints to business-process transformation and customer service are being recreated in cyberspace.

Instead of moving forward, government is making the same mistakes in a brand new way. What

can be done to reverse this technology regression? First, states need to establish true CIO positions and empower them with full enterprisewide authority over technology planning, acquisition and management. Second, common technology architectures and standards need to be established for the government as an entity and enforced consistently across all agencies. And finally, a single Internet gateway to government needs to be established through which a citizen can provide information once and link with all required programs and services. Imagine filing your taxes, renewing your driver's license, looking for a job and checking the latest developments in Medicaid, Medicare and Social Security all from one Web portal. Plus, this site would be personalized to know your specific needs. It can happen. But only if states think enterprisewide — not just agency to agency.

The opportunity for fundamentally transforming government through the Internet is significant — but quickly slipping away. Let's learn from mistakes already made and use the huge opportunity before us to treat citizens as customers in the dawn of e-government. ▀

JANE C. LINDER
AND DREW PHELPS

'Design' critical in Information Age

INFORMATION TECHNOLOGY professionals are missing a critical skill for the "no-time-to-read '00s": information design. Providing broad access to data created an information deluge. Now it's clear that getting more information isn't the bottleneck; making more sense of it is.

Mastering information design can help. Information design is the practice of logically organizing information to clarify what it means, distill that meaning to its simplest form and get the meaning across as effortlessly as possible.

Well-designed information is actionable — it's clear, truthful, timely and obviously meaningful in the context of the decisions at hand.

Have you mastered information design when you can create slick PowerPoint presentations? Not by a long shot. It involves serious analysis and thoughtful communication. For example, a pharmaceutical firm couldn't tell why it was losing market share in one region of the U.S. — despite voluminous data on physician prescriptions. Its conventional approach to the problem — focusing on its regional competitor — wasn't getting it anywhere. When information designers boiled all the data down to two easy-to-read, formatted pages, they pinpointed the real problem: An influential doctor had changed his prescribing patterns. So the company targeted the physician personally with a renewed marketing effort. Then the IT organization took over to ensure that the new two-page format flowed right out of the firm's information management systems.

In many cases, using graphics engages people and helps iron out tough issues fast. And when the message jumps off the page, people make good decisions more quickly. According to Edward



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ward Tufte, author of the landmark book on information design *Visual Explanations*, the space shuttle *Challenger* was lost because of an information design failure. The night before the launch, concerned engineers sent 13 disorganized charts about O-ring failures to NASA officials. If the data had been presented well in a simple chart showing the correlation between

outside temperature and O-ring failure, everyone would have seen immediately that to launch that chilly morning would be a terrible mistake.

Good information design will also help customers navigate your Web site. Logical navigation can mean the difference between a delighted visitor and one who turns his back on you in disgust.

In spite of the benefits, most IT professionals aren't using information design. Why? They're unfamiliar with its concepts, and they shy away from getting involved with content. Some information professionals believe their responsibility ends when they've provided access to information. In contrast, the info jockeys in high-speed firms embrace information design to provide actionable information. To bridge the gulf, executives must make information design part of everyday information management. Here's how to get started:



DREW PHELPS is research associate at the Andersen Consulting Institute for Strategic Change. Contact him at drew.phelps@ac.com.

■ **Pilot information design for a mission-critical issue.** Tackle a complex problem where executives say a 50% improvement in decision speed will set your firm apart. Ask your toughest line executives to help lead the charge.

■ **Bring in design pros to show you the way.** Hire information design experts for your pilot. Then tap some of your own business-oriented analysts who are good listeners, analysts and communicators to shadow the experts as they do their work.

■ **Build information design literacy.** Tell your information management staff that making information actionable is everyone's job. But it's not rocket science. Make time for information design classes from firms that provide training in it. Expand your recruiting net to include some schools that teach Internet technology and information design together.

Many IT executives will legitimately complain that information design falls well outside their traditional roles. They're absolutely right — welcome to the real Information Age. ▀



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HACKER TRACKER

In 1996, Air Force security specialist Brian Koref tracked a pair of hackers from the U.S. to Sweden, where they're now on trial. Such security skills are filtering out to the private sector, as fear of hackery grows. **▶ 38**

CO-OPETITION

IT can take a lesson from the computer business, in which competitors cooperate on standards to benefit everyone, writes Kevin Fogarty. That could be a workable approach for business-to-business exchanges. **▶ 40**

OUTSOURCING EVERYTHING

Martlet Venture Management is using an online service to store most of the office applications that partners use. It's convenient, but many think it's too risky to let outsiders keep key data for you. **▶ 42**

UNLIKELY IT PROS

Capital One is keeping its IT staff up to strength by training non-IT people. They attend an "IT University," where they learn not only technology skills, but also how to fit into an IT organization. **▶ 44**

PROFITS FROM IT

Logistics makes up a huge percentage of the costs of most companies and represents a huge opportunity for IT, Peter G. W. Keen writes. Automating logistical

systems can save 30% of a company's budget, making IT a key revenue source. **▶ 48**

FRESH START

What's it like to work at HomeLife, the furniture store spun off from Sears? Pretty cool. It's one of the first shops to go live with Windows 2000. And it's building systems its building from the ground up as it prepares to cut the cord from Sears' IT. **▶ 48**

ERP CAREER OPPORTUNITIES

The furious growth of the enterprise resource planning (ERP) market has slowed, but it's still a pretty rich field for career advancement. But the hottest skills aren't about one ERP application, they're about getting ERP to talk to supply-chain and other critical systems. **▶ 52**

MAKING CHANGE

Change management is more than just a buzzword. It's a series of techniques for assessing the impact IT-based changes would have on workers, and ways to educate worker so they accept new ways to do their jobs. **▶ 54**

FINDING E-JOBS

How do you move into exciting e-commerce roles when you're stuck in IT management with no Web skills? Parlay what you do know into a mixed role, integrating the old systems with the new, Fran Quittel advises. **▶ 56**



MANY YOUNG IT professionals like Kraft's Kevin Kaiser and Jackie Deraci-Barbanente say the stability of traditional companies is more appealing than the atmosphere at Web start-ups

THE NEW IT GENERATION

THEY'RE SMART, savvy and they were weaned on technology. They want it all, and could do anything they want. But they'd rather work at traditional companies than Web start-ups. In this first of a two-part series, *Computerworld's* Kathleen Melymuka talks with twentysomething IT pros like Kevin Kaiser and Jackie Deraci-Barbanente (above) at Kraft Foods about what they do and where they want to go from here.

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Hunting Hackers: How to Fight Back

BY DEBORAH RADCLIFF

In police work, sometimes the longest journeys end with the shortest trips. That's what happened to Brian Koref, who spent months at the Air Force Office of Special Investigations (OSI) tracking down a pair of Swedish hackers who invaded U.S. Air Force, U.S. Army, NASA and other military systems, helping themselves to password files and other sensitive data in the process.

Koref was scheduled to fly to Stockholm tomorrow, to testify against Charlie Malm and Joel Soederberg, both 24. But the trip was canceled when the two pleaded guilty to five counts of unauthorized intrusion into U.S. military systems.

Their trial for invasion of servers at WIRE Ltd., the British company through which they launched their U.S. attack, started last week, according to Matthew Richard, former director of WIRE.

The charges relating to the U.S. intrusions make up "a great case with a lot of robust evidence," said Koref, who's now in the Air Force Reserve. He works full time at business Internet service provider Conxion Corp. in Santa Clara, Calif.

The plea bargain was the culmination of months of electronic gumshoe work in which Koref backtracked the attackers through multiple servers within defense networks and beyond. He brought in the Swedish National Police and even participated in a raid and the interrogation of the suspects.

Analysts say detective skills like Koref's, which are often gained in military-security posts and law enforcement, are beginning to filter out to private-sector information technology operations, pulled by fears engendered by high-profile hacks like last month's incident at Wallingford, Conn.-based CD Universe.com, which found some of its customers' credit-card numbers posted on the Web. And last week, Yahoo Inc., Cable News Network, eBay Inc., Buy.com Inc. and ZD Inc.'s ZDNet were all hit with what appeared to be coordinated denial-of-service attacks from parties as yet unknown.

Koref now uses his detective skills to find out how and where attackers strike Conxion clients like Microsoft Corp., a prime target of crackers.

Other private-sector organizations are using the same techniques for liability purposes to identify the source of illegal software or pornography posted

secretly on their sites.

A lot of the skills needed for tracking attackers grow out of military computer crime units, which have learned a lot since the early '90s, when the Kevin Mitnicks of the world tromped freely through their systems. In the past four years, each branch of the military has built computer crime labs that provide the technical support and analysis for computer-based investigations.

"We're seeing a 50% increase in these cases every year. We're getting better at watching our networks [and] investi-

gating and catching computer criminals," said Jeffrey Hormann, commander at the Computer Crime Resident Agency, part of the Army's Criminal Investigation and Command in Fort Belvoir, Va. "We have better-trained administrators, more intrusion-detection capabilities, better-trained enforcement and improved processes in place to address attacks when they happen."

How They Did It

Koref's investigation started in November 1996, with a call from the Air Force's Information Warfare Center at Kelly Air Force Base in San Antonio.

"Their intrusion-detection filters turned up a string of characters with the letters PHF in it, and [we] wondered if it warranted further investigation," Koref said. "This was an attack signature against Apache Web servers that was rampant at the time."

Koref traced the attacker's movements by looking up the IP addresses the packets came from, checking through the domain-name registry Internic Registrations.com and following them through various hops among IP addresses of Department of Defense computers and beyond.

In so doing, he discovered that hackers were helping themselves to buckets of password files as they infiltrated numerous military and NASA installations. He even tracked the attackers back to a pornography site, from which they had downloaded customer credit-card numbers.

Koref's break came when he followed an IP address back to another department of the U.S. military. This time, the attacker had entered through a military Web server, whose administrator was willing to help, with log files and other information. This address originated from an Internet service provider in Sweden.

That's when Koref contacted the Swedish National Police.

The Swedish police contacted the service provider, Sweden's chief telephone company. They then pulled the remote server access logs at the company and correlated the dynamic IP addresses assigned to users who had dialed in to the Internet service at the exact times of the attacks on the military sites.

The phone company was able to trace those connections back to the phone number and address of the attackers.

Electronic Tracking

Reasons for tracking in the private sector:

DAMAGE CONTROL

Virus hunting. The only way to contain a virus is to track it to all the machines it infected until you find the first victim on your network.

Response to attack. When a cracker breaks into a corporate network, tracking skills are essential in locating the point of entry and the services exploited for accurate patching, repair and, if desired, prosecution.

LIABILITY

■ If illegal images or files are found on corporate servers, a company must follow the evidence trail back one hop to prove the images didn't originate from the organization.

■ If a corporate computer is hacked into and used as a launch point for other attacks, an evidence trail back to the last hop would limit corporate liability.

Employee harassment. In a case researched by New Technologies Inc. in Gresham, Ore., an employee was using her computer to electronically stalk, harass and terrorize her boss. The electronic evidence trail was overwhelming, and the employee was fired.

In January 1997, Koref accompanied the Swedish National Police on a raid of the crackers' lair, an apartment — empty except for the two young men, a dozen stolen computers and four phone lines — in a subsidized housing project near Stockholm.

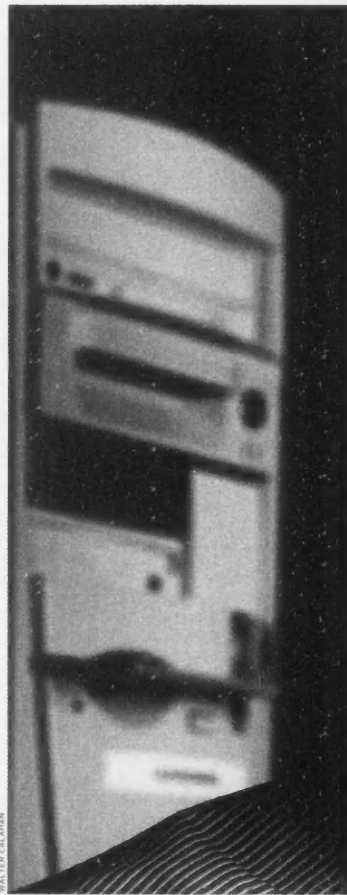
"It was a hacker heaven," Koref said.

Cases like these call for a lot of old-fashioned detective work — phone calls to other victimized server administrators, subpoenas and search warrants that allow law enforcement to review log files at Internet service providers and universities, through which hackers launch most attacks.

It's not easy.

In one case, called Operation Moonlight Maze, Air Force and Army computer crime investigators early last year tracked the attacks to an Internet service provider in Russia. But the trail went cold.

"ISPs dump records in 30 days," said J. W. Gee, commander of the Army's field investigative unit. "It's difficult to get the type of cooperation you need



from these administrators in a matter of weeks. But that's what's needed to trace the linkage back. Unfortunately, hackers know this."

It's even worse in the private sector because corporate investigators lack the authority to conduct searches outside their own corporate borders.

"The hardest part is the human factor," said Curt Bryson, formerly an Air Force OSI counterintelligence and forensics expert. He's now a private-sector trainer in computer forensics at New Technologies Inc., a security consulting and training firm in Gresham, Ore. "You need to talk to the other administrator, who has privacy issues and is afraid to talk because of his or her legal department."

Bryson learned it's best to address the administrator's concerns and try to strike some middle ground. Maybe the investigator doesn't need the perpetrator's e-mail address; confirming that the IP address came through that server may be enough, he said.

Cases like these also call for an un-

precedented level of multiagency cooperation, according to Matt Parsons, chief of computer investigations operations at the Naval Criminal Investigative Service (CIS) in Washington.

"We've come a long way in information sharing," he said. "If the trail leads to another military site, we call those administrators. If it leads beyond military servers and into a private or college site, we call the FBI. And if it comes from a Navy box in Australia, we pick up the phone and call our counterparts in Australia, the Australian National Police. We can also call other agencies."

Reporting the Problem

A centralized reporting database at the National Infrastructure Protection Center (NIPC), which is managed by the FBI, helps investigators sort through cases and minimize redundant investigations. Through the NIPC, law enforcement agents can check for similar attack patterns as reports of incidents flow in from authorities and the private sector.

Similar attacks against businesses and private-sector organizations have also been rising for the past three years, according to reports by the American Society of Industrial Security (ASIS) in Alexandria, Va., and the Computer Security Institute in San Francisco. According to ASIS, Fortune 1,000 companies last year lost more than \$45 billion in intellectual property theft, mostly through their computer systems.

Private-sector reporting is also on the rise. According to the CIS's 1999 Computer Crime and Security Survey, reporting rose from 37% in 1996 to 57% last year.

Because the best way to entice law enforcement to act is to present it with solid evidence (specifically log files that provide an evidence trail of the attacker's illegal activities), such investigative techniques will eventually be essential in the private sector, said Capt. John Jarrett, computer crime investigator for the city police department of Show Low, Ariz.

Vendors are taking notice of this

need. In fact, some vendors, like Recourse Technologies Inc. in Palo Alto, Calif., and Network Ice Corp. in San Mateo, Calif., are beginning to market "response" tools that automate much of the process Koref did manually.

Peter van de Gohm, director of information asset protection at Enron Energy Services, an unregulated division of the \$48 billion energy company Enron Inc. in Houston, said such investigative work is "definitely needed in the corporate sector." For example, such skills could track and contain incidents within global corporate networks.

"You may have a virus that first manifests itself in, say, your Australian office. The only way to stop revenue and data loss is to isolate the virus and make sure you get every infected machine," said van de Gohm, who was formerly with the Air Force's security police and was responsible for intellectual property protection for the Air Force's next-generation strike fighter aircraft program. "You also need to do this post-mortem to establish the facts. You need to know why your countermeasures didn't work so you can repair them."

Skills in Action

In December, Conxion engineers used such skills to deflect a denial-of-service attack against two World Trade Organization (WTO) servers housed at Conxion. Between Nov. 30 and Dec. 3, the Electrohippies tried to flood the WTO servers with traffic and take them off-line. Conxion tracked the IP address back to the Electrohippies site, deflected the attacks and redirected the traffic back to the Electrohippies site, which was overloaded.

Jarrett said he would like to see more organizations get involved in actively protecting their own assets.

"I'd really actually hope people get tired of things and take a stand," he said.

Gathering your own evidence could also limit liability in the private sector. For example, if an organization is hacked and used as a launch point, it would need to prove the attack originated elsewhere. The same goes for illegal images of child pornography secretly stored on corporate servers.

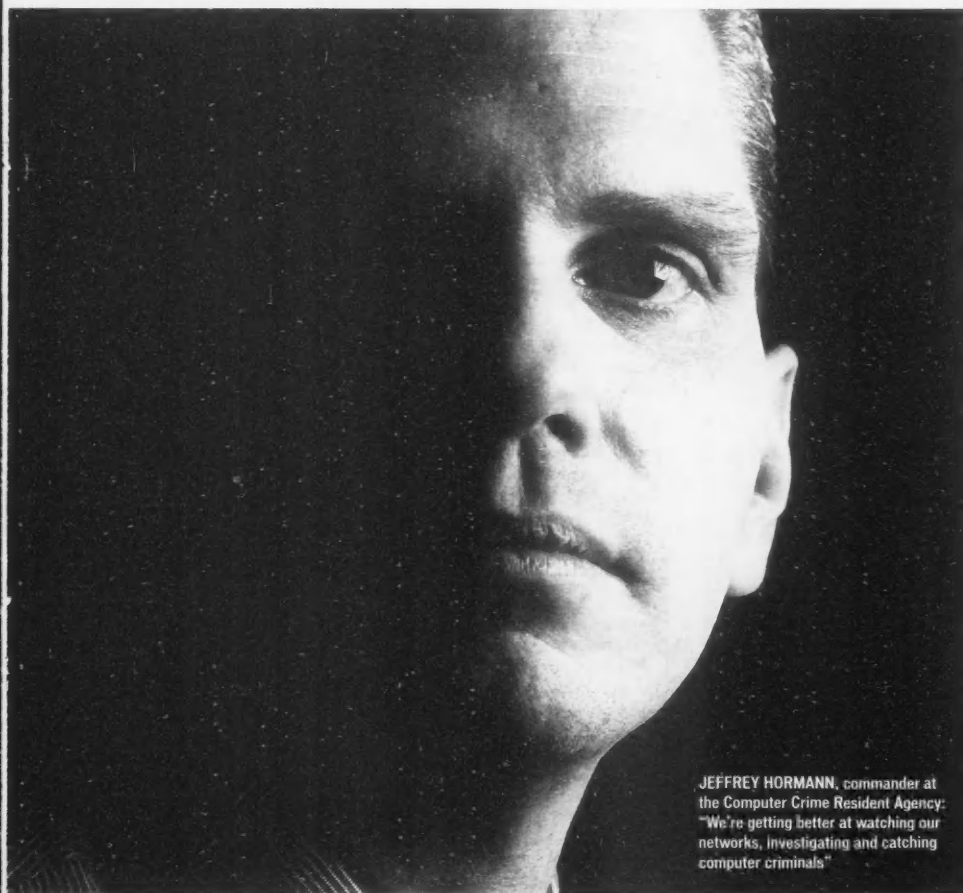
Although they can't talk about them, military computer-crime investigators say more new cases are moving toward prosecution, thanks to such cyber-sleuthing techniques.

"With the right skill in reading audit logs and tracing packets back to where they came from, you could head off a lot of problems," Koref said. ■

Radcliff is a Computerworld contributing writer in Northern California. Contact her at derad@aol.com.

MORE THIS ISSUE

Brian Koref talks about IP security. See page B2.



JEFFREY HORMANN, commander at the Computer Crime Resident Agency: "We're getting better at watching our networks, investigating and catching computer criminals."

KEVIN FOGARTY/BRICKS AND CLICKS

It pays to work with your enemy

A NICE BUT OVERSCRIPTED PR PERSON called me last week to talk about a vendor's "holistic, interactive enterprise Internet business solution" and didn't understand why I thought the phrase was funny. That kind of over-the-top hyperbole makes many IT vendors, especially start-ups, sound like they're joking — or just plain nuts.

But you have to admit, IT vendors are good at selling technology. And if you're getting serious about business-to-business e-commerce nets, you could do worse than learn from some of their techniques.

Case in point: business-to-business networks. The simplest way to build a B-to-B network is just to wire XML into your current electronic data interchange system.

Voilà! Your old, stodgy vendor network becomes a shiny new

end-to-end B-to-B solution.

But extending that network to other players — and thereby extending the amount of business you can do and increasing the amount of money you can make or save — can be tricky. First, you have to attract a

wide enough variety of suppliers to create price competition. And that can be tough.

You'd figure General Motors wouldn't have any trouble attracting enough vendors to create that critical mass. GM is moving its \$87 billion, 30,000-vendor supply chain online, hoping to create savings that vendors can use to cut prices for GM. But Ford is launching a competing site, meaning those 30,000 vendors have to either pick one network or spend extra time and money to join both.

In most markets, there are more than just two or three good-size companies.

That means that if everyone launches an exchange but none of them are connected or compatible, it gets very expensive for the suppliers you were hoping would give you lower prices. At worst, the whole mass could collapse into a chaotic mess of unconnected, comparatively expensive extranets.

That's where the vendor marketing lessons come in.

When a new technology is launched, the first couple of vendors to market generally duke it out for a while. But they quickly reach the point where they have to cooperate and they start negotiating a standard protocol for their products to interoperate. That increases sales of everyone's products.

HTML, XML, Asynchronous Transfer Mode technology, various breeds of Ethernet, network management and e-mail protocols were all established during negotiations among vendors hoping to make money via agreed-upon rules of interoperability.

Efforts at standardizing Unix and Java, on the other hand, have suffered because the vendors involved have spent as much time defending

their own turf as they have negotiating common ground.

Vendors want to grab market share by doing business with everybody. That's a lesson some e-companies learned early. Take American Airlines' Sabre reservation system, for example. American built it and let in the competition on relatively even terms — and all the airlines benefited, especially American.

Deals like that aren't easy to set up, especially amid tight competition. But there's serious money to be made or saved by reducing the friction between buyer and supplier.

Forrester Research predicts that \$2.7 trillion in procurement money will flow through various kinds of online exchanges by 2004. (Gartner Group says it will be \$7.3 trillion, but what's a 270% variance between friends?)

If you can standardize the place and protocols by which you and your competitors can do business, you'll get their

notice. If you make it secure enough that they know you're not watching over their shoulder as they make deals, they'll start to believe in you. If you go the extra mile to make the exchange fair to both buyer and seller,

both might decide to work with you rather than building their own sites.

That way you can all concentrate on competing in your core business, rather than messing around with competing sites that don't do anything for sales of your actual products.

But if the site you end up with is a holistic, interactive enterprise Internet business solution, just enjoy it privately.

I've heard that one already. ▀

Kevin Fogarty is Computerworld's business editor. Contact him at kevin_fogarty@computerworld.com.

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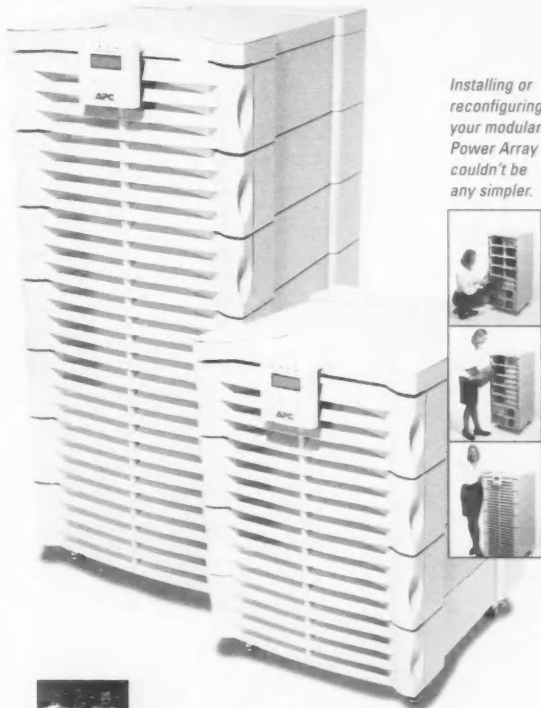


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Synchronization Services Tested on Web

BY MATT HAMBLIN

Martlet Venture Management Ltd. needed a centralized server to allow its 20 partners and

others to collaborate on contract drafts and Microsoft Office applications. The Montreal-based start-up didn't want to

go to the trouble and expense of managing a conventional dial-up network using its own server, so it has been beta-test-

ing a service from Berlin-based Space2go.com GmbH & Co.

Beginning next month, Space2go.com will give Martlet employees access to spreadsheets, PowerPoint presentations or contact information

on two secure IBM RS/6000 Unix-based servers in Berlin. The service will use dial-up lines, though Martlet eventually wants to move to wireless connections, said Jochen Wiechen, Martlet's chief technology officer.

"Right now, we are simply synchronizing laptops. But let's say I've been to a talk, and I'm waiting for a plane and don't want to get my laptop out of the case," he said. "Someday, I could get out my organizer and jot down notes that would be [synchronized] to the server, perhaps wirelessly."

Martlet vice president of marketing David Lavoie, who is based in Montreal, said synchronizing users' schedules has been difficult so far "because we work in different time zones, and getting everybody on the same page is important."

The service will cost a company \$6 for 100MB of space per month. That price includes an HTML/Wireless Markup Language (WML) front end for access from any WML device.

A Jump on the Competition

Space2go.com went into beta with its service in December and appears to have a jump on competitor FusionOne Inc. in Los Gatos, Calif., which announced a public beta release of a similar service on Feb. 2.

Starfish Software Inc. in Scotts Valley, Calif., Puma Technologies Inc. in San Jose and other firms offer synchronization services for handhelds, but so far only Space2go.com and FusionOne are addressing synchronization with larger applications, including the Microsoft Office suite, said analyst Jack Gold at Meta Group Inc. in Westboro, Mass.

"The concept behind Space2go.com makes sense for the smaller business, but the large IT manager would probably be worried about losing control of data," Gold said. Space2go.com provides password protection and 48-bit encryption of data on its service and is developing 128-bit encryption for transmissions.

It would make sense for information technology service technicians to consult a common server for service order updates from handhelds, "but we'd use our own server," said Steve Porostovsky, technical support manager at the Florida Department of Environmental Protection in Tallahassee. ■

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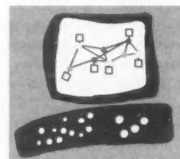
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Turning Good Workers Into an IT Gold Mine

JULEKHA DASH

WITHIN HER first month as a customer support representative at Capital One Financial Corp., a Falls Church, Va., bank, Catherine Lukhard knew she wanted to eventually work in IT.

"I wanted to know how the phone system worked, how calls were being routed to us," Lukhard explained.

Fast-forward five years, and today you will find Lukhard working as a telephony support specialist, supporting GeoTel, a call center application from Cisco-GeoTel Communications in Lowell, Mass. During that time, Lukhard has worked in various information technology roles, including telephony support specialist, routing and switch administrator and MIS specialist.

A large company may have many employees like Lukhard

who want to move from another department into IT. But it may not realize it unless the company supplies the infrastructure that enables employees to make a smooth transition. But exactly how does a company do that?

Lukhard said a combination of technical and nontechnical courses, assimilation programs and the opportunity to shape her own career were all factors that made her vision of an IT career a reality.

Growing Your Own

With virtually no unemployment among IT workers, companies increasingly need to identify and train workers in other departments to fill IT slots.

"Smart companies grow their own" talent, said Michael Boyd, an analyst at International Data Corp. in Framingham, Mass.

Moving employees into IT isn't an overnight process.

Boyd advises thinking long term about the IT roles your company will need to fill two or three years down the line and starting the process of identifying and training employees.

At Capital One, employees meet monthly with their manager to discuss their long-term career goals. During her early days at the company, Lukhard expressed an interest in moving over to IT.

Within six months, she was working on a database project that involved tracking human resources policies. Soon thereafter, she started taking technical courses at the company's IT University and was hired as a full-time database administrator.

"The Capital One culture empowers you. My manager asked me where I want to be in five years," said Lukhard.

Jeff Heslop, director of Capital One's IT University, said when employees express an interest in IT, the process for moving them into an IT role first starts in human resources, which identifies which positions need to be filled.

Then the employee's manager — as well as an IT manager — determine what skills the employee has and what skills are required to fill that job. IT University works with the managers and the employee to identify the appropriate training programs needed to move into that role.

In Lukhard's case, she not only took database courses — learning Access, Oracle and Microsoft SQL Server — but also telephony training, because that's where Lukhard had previous experience and had demonstrated an interest.

For employees to make a successful leap into IT, they need to develop confidence that they can not only handle

the technical challenges, but also have the interpersonal and business skills necessary to inspire confidence in their co-workers.

For example, Lukhard and her manager decided that she needed to improve her public speaking ability. Six months ago, she took a class on presentation skills.

"I would go to project meetings and fear standing in front of 20 people. This was limiting how I carry out my job," said Lukhard.

But since taking the course — in which participants were videotaped and critiqued on their presentation — Lukhard has come to regard project meetings as events that can help her grow, rather than experiences that are intimidating.

Assimilation

A combination of mentoring, an overview of the IT organization and changing job roles helped Lukhard assimilate into IT and keep her interest.

One of IT University's five "colleges" revolves around IT assimilation. New IT associates spend one day getting a broad overview of the IT organization, its organizational structure and how the department helps the company achieve its goals. Then the associates spend four weeks getting an overview of the department in which they will work.

The assimilation takes the employee from a "macro-level view of the organization to a micro-level view of the department they're working in," said Heslop.

As Lukhard's job roles changed, her mentors changed as well. Capital One would assign her a mentor in the area in

AT A GLANCE

Capital One

Employees: 10,000-plus

1999 revenue: \$3.8 billion

URL: www.capitalone.com

Number of IT employees: 1,500 full-time employees and 300 to 400 contractors

Location: Falls Church, Va.

Training Stats:

- Ranked 13th in *Computerworld's* 1999 survey of the Best Places to Work in IT.
- Employs 28 full-time employees and six part-timers or contractors within IT University.

- Provided 16,000 training days in 1999, which is double that of 1998.

- ITU is composed of five "colleges" in the areas of applied technology, operations, assimilation, business management and advanced technologies.

- Technical courses that IT University offers include basic technology classes such as Word and Excel, courses on databases, object-oriented technology and networking. ITU also partners with the company's competency planning and development division to develop employees' business skills.

which she worked. In addition, the fact that she has had three different job titles in the past year and a half has helped sustain her interest in IT.

"Before working at Capital One, I didn't have a career goal," Lukhard said.

Lukhard isn't the only employee Capital One has helped steer into IT. About a half-dozen of Lukhard's former colleagues in customer support now assume various IT jobs in the organization. And currently, Capital One's IT University is helping 28 employees train for IT jobs. ■



CATHERINE LUKHARD (with Jeff Heslop, director of Capital One's IT University): "Before working at Capital One, I didn't have a career goal"

Tips for Training Non-IT Workers For IT Roles:

- 1) Provide more than technical training. Courses such as presentation skills, project management and even stress management can help your new IT workers think strategically and develop leadership skills.
- 2) Don't expect to fill IT slots overnight. Think long term. Identify which IT jobs you will need to fill several years from now and

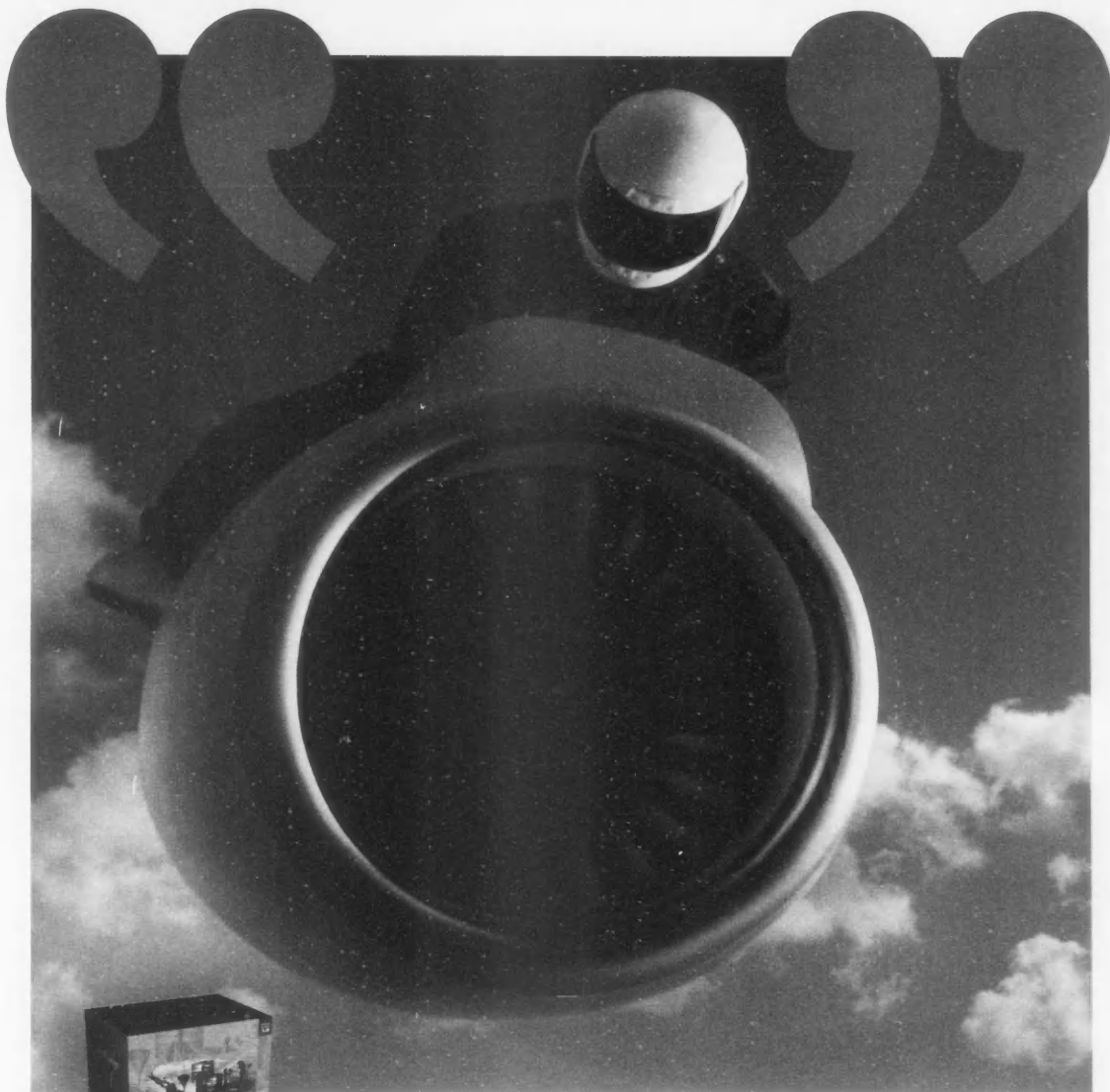
whether anyone within the organization can fill them.

- 3) Help new IT employees assimilate into their new roles. Assign mentors who have worked in the same role, provide an overview of the IT organization and its goals and keep tabs on their progress.

- 4) Put workers to the test by putting them on a project right away.

- 5) Keep new IT employees' interest by varying their projects or job roles.

- 6) Identify business or technical skill areas that need improving and provide the appropriate training.



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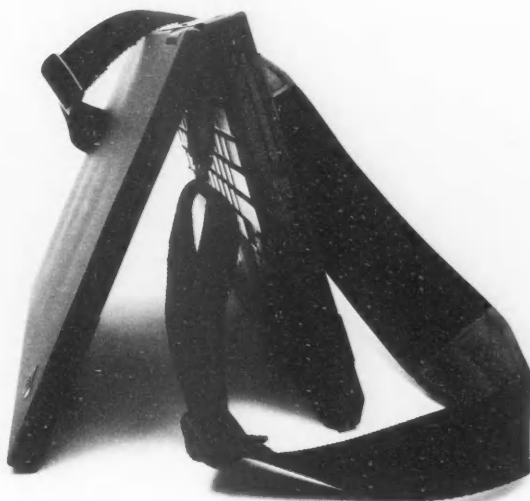
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WORKSTYLES

What It's Like to Work at ... HomeLife Furniture

Interviewee: Jim Jahrling, manager of operations, information systems group

Company: HomeLife Furniture Corp., a furniture retailer spun off from Sears, Roebuck and Co. in February 1999 (www.ehomelife.com)

Location: Hoffman Estates, Ill.

Tenure: Since June

Number of information technology employees: 10, including operations staff, applications developers and network staff. HomeLife will add about five more positions. "We want to keep the staff small, so everyone wears a lot of hats."

better community of teamwork because we're not inheriting someone else's systems."

Biggest challenge: "Oh, gosh. [Laughs.] Lining up and coordinating all the resources. We're partnering with a lot of different vendors, so getting the applications to talk to each other, building new applications to work with our data and making sure everything gets communicated correctly to everyone else."

Most challenging application development project:

"Figuring out what to give our stores to make it easier for them to sell our products. Our goal is to make sure they can

all communicate back to headquarters and with each other, and to give our sales associates ready access to the information they need to complete a sale."

What are your training plans for the year? "Since all of our systems are new, we're scheduling training from all of our vendors or working on a process of skills transfer with them - Microsoft, SAP, GE, Data General [for Windows NT/2000 and Unix servers]."

The one thing everyone complains about: "I don't hear a lot, to be honest. In IT we have our list of problems, but we have an intranet with a FAQ system, where people send in their issues and we resolve them."

Perks: "First crack on all the new technologies, being right on the leading edge with Windows 2000, comp time for working late or on weekends and departmental appreciation dinners."

Last companywide perk: "An employee open house on Jan. 23. All of our families were invited to come see our offices, and we had clowns and face-painting for the kids, movies in the cafeteria, catered food. Everyone came."

Would employees feel comfortable e-mailing the CEO?

"Absolutely. He's readily accessible at all times, and every Monday morning at 9 we have a company meeting."

Quote: "It's an entirely different culture here than at Sears. Sears is so large, people are more focused on one job. This is more of a small-company corporate culture, and working in a small company is great because you get involved in a lot of different aspects." - Leslie Goff



Number of contractors:

About 25

Number of end users:

130 at corporate headquarters

Number of stores:

133 in 20 states and Puerto Rico

Major systems initiatives:

"We're newly independent, and we're setting up all-new systems. Everything is being developed from scratch, and we're bringing our data over from the Sears systems. We have until January 2001 to convert to our own systems. But for now, everything is still on the Sears systems."

How do you manage that?

"We have a T1 connection to Sears' mainframes as well as to a lot of smaller OS/2 and Warp applications that have their own unique connectivity requirements. I wish I'd never heard of them. We're working with Sears' IT to convert all our applications to Windows 2000."

Are you a Win 2k beta site?

"Yes, we're in the Microsoft Rapid Development Program, so we're working with them to fine-tune 2000. We're actually running it in our offices now. . . . We want to use Active Directories as a single point of contact to integrate all of our systems."

What's it like to build a brand-new IT environment?

"We're small enough that we all know each other, and if things need to be done, they can be done fairly quickly. It forms a

PETER G. W. KEEN

IT's value in the chain

INTERNET-BASED LOGISTICS has transformed the economics of business more than any other factor in the past decade. Therefore, it should be a priority for IT to make a major contribution to business by showing how a company can boost profits through technology.

You could rattle off figure after figure on the payoffs from online logistics. Here are some of them from a forthcoming book, *Dot Com to Dot Profit*, that I've co-authored with Nick Earle:

■ Ryder Truck states that "world-class" supply chains have a cost advantage of 3% to 7% of revenue vs. that of the average firm. Note that the net profit margin of manufacturing firms is roughly the same 3% to 7%.

■ A 1997 study shows that leaders in supply-chain management have 50% to 80% lower inventories than median performers.

■ Online trading hubs reduce the prices paid for goods put out for bid by 3% to 5% for firms like General Electric and 9% for IBM.

■ Even in the best-run firms, around 20% of all orders and invoices contain at least one error. With online logistics, that figure drops to less than 1%. Lead times on procurement and distribution typically drop from weeks to days.

■ Business-to-business Internet portal Ariba typically reduces the total supply-chain cost of operating resources, such as office equipment, supplies and cleaning services, which amounts to around 30% of any company's operating budget, by 20% to 30%. For CIBC, a large Canadian bank that purchases more than \$1 billion per year in assorted goods and services, that's more than the average bank's net margin of 8% to 15%. Since operating resources aren't part of the cost of goods and services, any savings goes straight to the bottom line.

It's this scale of achievement and opportunity that has seen the explosion of business-to-business Internet portals.

But many firms aren't taking advantage of this logistics opportunity. Logistics has largely been an organizational orphan. Responsibilities are scattered around many functions, such as purchasing, accounting, sales administration, distribution and credit. Units that handle their own tasks aren't familiar with the wider picture of online integration, coordination and supply-chain collaboration. Senior management teams don't know the scale of the proven payoff and don't think of logistics as strategic. And people on the business

side are unlikely to be familiar with what's happening in the business-to-business Internet space.

What's needed is a center of excellence — a unit to lead the way by informing managers across the organization, bringing them together, highlighting practical opportunities, identifying business-to-business hubs, linking up with key customers and suppliers, evaluating vendors and logistics tools and keeping up with supply-chain research.

If IT doesn't take the lead here, who will? Every IT unit should have a team of five to 10 people that has online logistics development as its mission, just like many teams once took on re-engineering. If you need to come up with a business justification for such a group and its costs, here it is:

Take your company's latest balance sheet.

First, add up the working capital for all inventories and accounts receivable. Then calculate the impact of a 20% reduction in capital and multiply it by 12% (the average firm's cost of capital) or, if you have it, your company's actual cost of capital. That's the direct payoff from online logistics that you can achieve in less than a year without major capital outlays. Business-to-business hubs don't require SAP-type-scale systems development.

Look at the figure on the income statement for sales, general and administrative expense (SG&A) or overhead, and calculate the impact on profits if you cut it by 20%.

Add the two figures — working capital impact and SG&A reduction. Compare them with your company's pretax profits and then show the result to the chief financial officer. Typically, that figure will dwarf any short-term opportunity available to the organization to leverage its

profits. It's an opportunity that can't be missed — and IT is bringing a proposal to boost profits, instead of requests for capital. ■

If IT doesn't
take the
lead here,
who will?



Keen is chairman of Keen Education as well as an author and consultant. His Web site is www.peterkeen.com, and he can be reached at peter@peterkeen.com. His book is scheduled to be published in June by Jossey-Bass.

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New Kids On the IT Block

They're smart, savvy and very techie. They want it all and would rather work at the traditional companies they're with now than at Web start-ups. In this first of a two-part series, *Computerworld's* Kathleen Melymuka talks with several twentysomething IT pros about what they want out of work.

THEY'RE THE E-GENERATION. They drank in technology with their mothers' milk. They mastered the mouse before they could speak, typed before they could write. They learned their ABCs on PCs, their arithmetic with Math Blaster. Their toys and tools are digital; their mail, electronic. They have the confidence of people who have always lived amid technology. Change has been the constant in their lives, and they love it.

We talked with 15 of these "new kids" and found them eager, cocky, smart, thoughtful, humble, idealistic and surprising. They combine new tech skills and a hunger for growth with old-fashioned attitudes about work and life.

And listen up, information technology managers: These people didn't come to your company by mistake; they came because they're intrigued by business, they want to contribute and

they want you to show them how. If you understand why they came to you in the first place and what they want out of work, you just may be lucky enough to keep them.

Internet Schmineternet

Despite the online world they live in, these young folks have chosen to begin their careers at "traditional" companies because they think that choice provides better opportunities for growth and a balanced life.

"A traditional company poses more of a challenge," says Chris Meyerpeter, 27, an IT communications coordinator at Monsanto Co. in St. Louis. "There's more leeway to dabble into different areas and find out what you like."

Jude Shabry, 26, who previously worked for a California start-up, says her job as a systems officer at Bank-Boston in Boston allows her the luxury of exploring new technologies. "At a small company, you're basically running

everything on a day-to-day basis," she says. "There's no time to explore new things. Here, I get a lot of freedom."

And that includes the freedom to go home. These new kids don't identify with the stereotype of the one-dimensional geek burning the midnight oil.

"I don't live to work, I work to live," says Jackie Deraci-Barbanente, 22, an associate systems analyst at Kraft Foods Inc. in Northbrook, Ill. "Here, I've been able to work with new technology and maintain a work/life balance. There's no price I could put on time with my family."

Traditional benefits, especially assistance with continuing education, also count for a lot, says Omar Lari, 25, an analyst who's working on an advanced degree with financial help from his employer, State Street Corp. in Boston.

Another common thread is a fascination with business. "Technology wasn't the reason I picked Kraft," says Madeline Morales, 23, a senior business ana-

lyst. "Technology is important, but [I want to] focus on business and understand how each function interacts with the other."

"I wanted a company that could expose me to a variety of areas," agrees Mike Vannoni, 25, a senior business analyst at Kraft. "Even the latest and greatest is not as fulfilling as business strategy."

Choosing a Culture

Although younger folks have a reputation for job-hopping, many like the stability a large company offers. "Caterpillar provides job security that dot-coms don't because their chances of succeeding are minimal," says Keith Brummel, 23, a programmer/analyst at Caterpillar Inc. in Peoria, Ill.

Many were drawn to companies that have well-established, unique cultures. "I had an internship here, and it offered a lifestyle that I like," says Vannoni.

For some, culture trumps even tech-



NET KIDS KEVIN KAISER AND JACKIE DERACI-BARBANENTE of Kraft Foods are part of the younger, e-generation of IT professionals who have been weaned on technology and are intrigued by business

nology. "Start-ups may have newer applications, but I wanted the culture of Southwest," says Colleen Campbell, 24, a programmer/analyst who likes the playful, family atmosphere at Dallas-based Southwest Airlines Co.

In contrast, a start-up is culturally volatile, says Kevin Kaiser, a 24-year-old senior business analyst at Kraft. "The culture could change if someone is having a bad day," he says.

Finally, these folks are highly skeptical of tales of easy money in the dot-com world.

"The stories of [people] going off and becoming millionaires are blown out of proportion," says Ingrid Eikinas, 27, an assistant vice president at State Street. "I think I can do much better here."

The new generation especially wants to be challenged and treated as adults. They want managers to test them, stretch them and give them more than they think the young people can handle. "Throw things at me that are diffi-

cult," says Lorraine O'Connor, 24, a senior systems analyst at State Street.

The underlying need is to keep growing. "We're very eager to learn," says Marc Dugger, 26, a programmer/analyst at Southwest Airlines. "Feed us as much new technology as you can. I just want to know everything."

They want a variety of experiences, but that can be a challenge to IT managers when there's mundane work to accomplish. And they want their managers to think of them as people, not resources. "My team leader cares about me as a person, and that makes me feel good," says Campbell.

They want to feel that they own their work. "I want responsibility and autonomy on a project," says Vannoni.

But they also realize they can be overenthusiastic and don't mind being reined in. "Make sure I stay on a single

task instead of getting too spread out," Brummel says. "Keep me focused."

But use a light touch. "Give me a project and trust that I can succeed on my own," says Amy Younggren, 23, a management associate at Prudential Insurance Company of America in Newark, N.J. "Be there for questions but

don't be over my shoulder."

NEXT WEEK:

You have them on your staff. So how are you going to keep your young IT professionals in today's volatile job market?

Many of these new kids would rather not job-hop. "I can certainly grow my career within Caterpillar," says Jamie Clark, a 22-year-old programmer/analyst.

They reject the traditional IT value of working a burnout schedule. "The old school is,

'Come to work at 5 a.m. and stay till midnight if that's what [we] have to do,'" Kaiser says. "But I have a life outside."

O'Connor notices a generational difference in attitudes toward change. Older IT workers "are used to systems that

are more stable," she says. "I expect that the status quo will change quickly."

They tend to see the older folks as the maintainers and themselves as the innovators. "Our generation takes things for granted," says Sohil Shah, 22, a Java programmer at AutoZone Inc. in Memphis. "We don't care how some complex application functions; we just build on it. The older IT people have had the chance to see that application evolve, so they have the knowledge [of how it works]."

Shah says cross-generational teams use the strengths of both generations. "It's important to not get bogged down with those details, because technology is moving so fast," he explains. "But it's still important to know what happened in the past so you don't make mistakes in the future."

Five years from now, most of these young people expect to have MBAs, facilitated and financed by their companies. Many plan to integrate their technology skills with business. "I want to be exposed to a wider range of technology and experience outside technology," says Kaiser. He says he's confident his company can accommodate his plans. "If I get tired of doing systems, I know I'll have the opportunity to move into marketing or whatever," he says.

Some, though equally ambitious, want to stay in technology. "I definitely want to be a tech person," says Shah. "I do not see myself on the business side. I want to move up, but in the technology stream."

Others are leaving their options open. Asked where she wants to be in five years, Eikinas responds, "That changes weekly."

What They Want

The future may be uncertain, but these new kids have clearly thought about what they want for now. "I want personal satisfaction," says Shah. "Every day I should learn something new."

They don't want to be labeled or limited. "I never want to go so far down one line that I end up stuck there," says O'Connor. "I want to develop [not only] technology skills but also personal and social skills."

They're determined to enjoy what they do or stop doing it. "If I don't enjoy coming to work every day, I quit," says Kaiser. "If you don't enjoy what you're doing, it makes the rest of life miserable."

They want to be the best. "I want to be able to get the training I need to remain on the edge," says Meyerpeter.

But beyond everything else, they want balanced lives. They want to integrate technology and business, colleagues and friends, work and pleasure, career and life. "My husband and I are both in technology because it's so much fun," says Eikinas. "I want to be having fun. I want to be inspired." ■

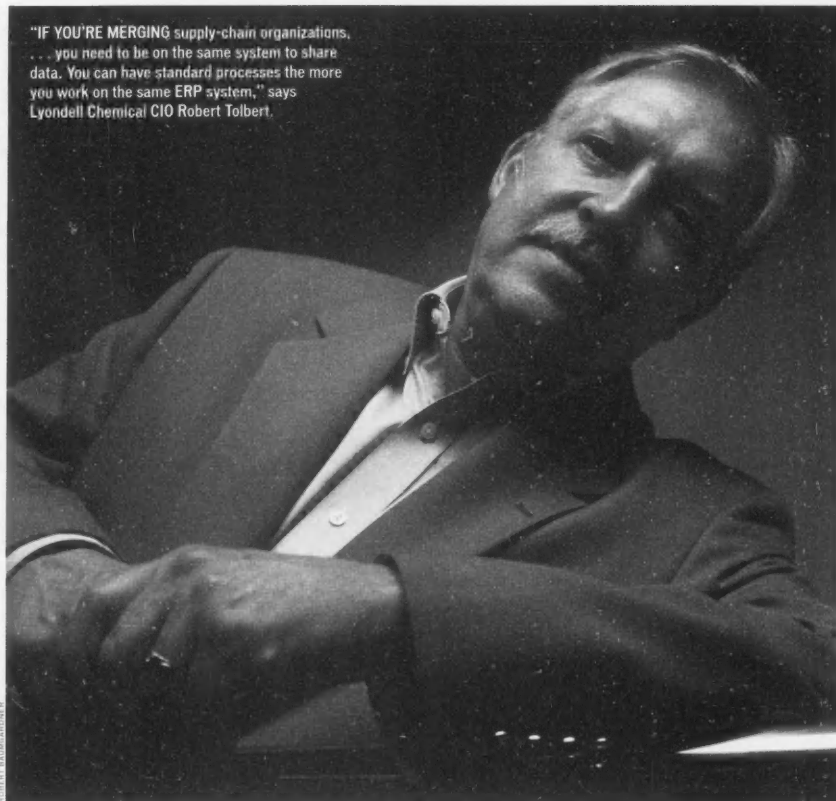
COMPUTERWORLD
GUIDE TO **CAREERS**
WITH ERP

IN THE FEB. 21 ISSUE

"ERP's Promised Lands"

As companies expand their ERP efforts to new units, systems and global markets, they need IT pros with a combination of ERP experience, Web skills and industry knowledge.

"IF YOU'RE MERGING supply-chain organizations, ... you need to be on the same system to share data. You can have standard processes the more you work on the same ERP system," says Lyondell Chemical CIO Robert Tolbert.



ERP attitude

Early ERP implementations have proved to be costly and time-consuming. Companies are now trying to integrate ERP software with other systems, creating new staffing challenges. By Erik Sherman

IT PROFESSIONALS like to hitch their career wagons to the most popular stars. A year or two ago, enterprise resource planning (ERP) seemed to be just the ticket. Predictions of 30% annual growth in the ERP market were flying, and the demand created by corporations lining up to install ERP systems was driving up salaries of those with experience in software from SAP AG, PeopleSoft Inc. or Baan Co.

How things change. ERP market growth is down considerably — though it's hardly shabby, with analysts estimating annual rates at 15% to 16%. Many companies have become disenchanted with two-year implementation schedules, budget-breaking costs and promised benefits that don't seem to appear.

But companies are still trying to integrate ERP software with other business systems to capture that missing return on investment. And those using acquisitions to grow have to install ERP systems in newly acquired businesses.

In other words, there are still opportunities in ERP. But they require a different approach than becoming an "expert" in a particular application. Those who succeed will know how to connect ERP with supply-chain and e-commerce systems — or how to integrate different ERP modules — both on a program level and at the business process architecture level.

Lyondell Chemical Co. had the full ERP experience with an SAP R/3 implementation that lasted from 1995 to 1997. Once the new system was up running, it might seem logical to conclude that the information technology department's role would have become one of maintaining the system. But that hasn't been the case for the Houston company, which has more than \$8 billion in annual revenue and 9,000 employees worldwide. Like many other corporations, Lyondell is pursuing an acquisition strategy. It has added two companies in the past few years, necessitating two more SAP implementations.

"If you're merging supply-chain organizations to be efficient, you need to be on the same system to share data. You can have standard processes the more you work on the same ERP system," says Lyondell CIO Robert Tolbert.

So Lyondell's future involves continuing implementations of R/3, not only as it acquires new companies, but also when it upgrades to R/3 Version 4.6.

Lyondell brought in consultants for each phase of its first implementation project: system design, report and feature customization and training. Lyondell employees worked alongside the consultants during each of those phases so the company could retain their knowledge. That was important because SAP has its own programming language and a notoriously long learning curve.

"After the first couple of times, you have some in-house experience. So the third time, you don't need as many consultants," says Tolbert. "We don't have to do the architecture again. The documentation is done. The training modules are available."

With fundamental ERP experience in place, Lyondell is looking to upgrade from R/3 Version 3.1H to Version 4.6 this year. That's a "fairly big step," says Tolbert, because Version 4.6 features changes in interface and functionality, especially in the supply-chain and e-commerce areas.

With fewer companies relying on outside expertise, Tolbert says market pressures have made ERP professionals "more available and a little less expensive." Still, there are premiums for designers and people who understand integration across modules.

Wanted: Techs With Business Skills

One company that's discovering the importance of integration is Celestica Inc., a \$3.8 billion IBM spin-off in Toronto. A contract electronics manufacturer, Celestica uses an ERP package called Business Planning and Control System (BPCS) from Chicago-based System Software Associates Inc. (SSA) in all of its plants except those in Asia. The Asian plants use SAP/R3, which is what they were using when Celestica acquired them.

Celestica not only has to integrate R/3 and BPCS, but it also has to add other applications because it found that standard ERP systems don't offer all the capabilities it needs to serve its clients. The company is taking a best-of-breed approach, using ERP as a "transaction engine" and integrating additional packages, such as supply-chain planning systems, from companies like i2 Technologies Inc. or Manugistics Inc., says Harvinder Sembhi, director of corporate supply-chain management integration at Celestica.

Sembhi says he currently hires people only from within Celestica. While a couple of the members of his 11-person team come from IT backgrounds, Sembhi says he concentrates on people who have functional expertise in areas like warehouse management, quality management and procurement. Such knowledge is critical because much of an ERP implementation involves aligning business processes with the software's capabilities. At first the company had help from SSA, but now in-house employees have enough experience to train new people, saving money.

"They come into the team with a lot of [Celestica-specific] business process knowledge," Sembhi says. "I think that's why we've been so successful," he says. "If people understand the business, they can train the users and make sure they're aligned with

Knowing What Makes It Tick

Many companies have a vital need for employees with solid experience in business processes, even when they first install ERP applications.

Charles Industries Ltd., a Rolling Meadows, Ill., manufacturer of telecommunications equipment, has 1,100 employees in seven facilities. The company uses SSA's BPCS software. It first deployed the package seven years ago, when it was more of a manufacturing resource planning system. Back when it was first installing the software, Charles Industries started training IT employees on manufacturing processes because the entire business rests on them.

"It's how we forecast, how we cut shop orders, how we do cycle counting and report production, how we handle the maintenance and do shipping," says **Mike Nichols**, director of information systems. Particular experience with BPCS was less important. As new versions come out, SSA representatives meet with Nichols and his staff to explain new functions.

Less useful, says Nichols, is knowledge of a specific type of ERP software, because it's non-transferable. "If you're an SAP technician and you know their language, you can go to any other SAP shop," he says. "It doesn't help you if you go to a PeopleSoft or Baan shop."

It's also important to remember that not all companies use ERP. **Musiland Group Inc.** in Minneapolis does about \$2 billion in business a year without it. "At this point in time, it wasn't worth the pain we would have to go through to make it work," says CIO **Steve Danker**. Musiland had already addressed Y2K, so it had less pressure to move than some companies. That doesn't mean the company won't change its mind and decide that ERP is necessary. But the emphasis for now is on the Internet and Web technologies.

Danker says IT pros should bet on basic skills like project management, not on technology trends. "The IT professional marketplace out there is an evolving beastie," he says. "It's hard to tell what the next hot technology is going to be."

Or, as **International Data Corp.** analyst **Christian Munz** puts it: "Today's ERP system will be tomorrow's legacy system." — Erik Sherman



NICHOLS: Business knowledge is vital

the business process requirements."

Celestica is an example of a company where ERP has moved from the realm of IT to business. Technical involvement generally extends only to the installation of necessary hardware and software, though sometimes the company needs site-specific interfaces to other data systems. Sembhi's department even performs the user testing.

"Any changes are dictated by the business," says Sembhi, "so really the business people are driving the requirements for IT." ■

Sherman is a freelance writer in Marshfield, Mass.

adjustments

Change Management

BY LESLIE GOFF

THE ONLINE revolution and its effect on corporate America has proved that you can teach an old dog new tricks, but don't expect that old dog to just roll over; it's going to bark and whine and chase its tail plenty before it gives you its paw.

That's where change management comes into play. It's one of those abstract topics that people pay a lot of money to attend seminars on, or get paid a lot of money to write weighty books about, but can't put their fingers on.

When it's finally boiled down, it's really about how to get users to accept a new business process — and the technology that enables it. Change management is something project leaders, business analysts, applications developers, help desk staffers, trainers, managers and executives should understand and practice.

"It really is human beings that make companies work, not technology," says Gabriel Cooper, a consultant in Santa Rosa, Calif. "Technology is just a tool, and users have to be excited about it, believe in it, [be] trained in it and supported in it. And change management is about making sure all of those things are included from the beginning as part of a project."

Services in High Demand

Although the notion of change management has been around a long time, companies are now putting more stock in the methodologies because of the increasing Webifying of business. Research firm International Data Corp. (IDC) in Framingham, Mass., estimates that the U.S. market for change management services will exceed \$6 billion by 2003.

But not every information technology project requires formal change management techniques. Upgrading from Windows NT 4.0 to Windows 2000 or switching to a new voice-mail system isn't likely to create tremendous angst

DEFINITION

Change management is a planned approach to integrating technological change. It includes formal processes for assessing the impact of the change on both the people it affects and the way they do their jobs. It also uses techniques to get users to accept a change caused by technology and to change their behavior to take advantage of new IT functionality.

among users. But new applications that fundamentally alter the way a group of people operate, both as individuals and as a whole, and the way they relate to suppliers, customers and one another will create a lot of anxiety.

Face it: An SAP implementation, the introduction of an extranet to deal with suppliers or the creation of an e-commerce site are going to change the routines for everyone from top executives to administrative assistants.

Not only will they have to master a new technology, but their roles in the corporate universe may also become drastically different. At the very least, they will have to

acclimate to doing their daily work in a completely new way.

In some cases, that's not just anxiety-provoking; it's downright terrifying. And change-management advocates say IT professionals who may feel invigorated by a new technology often fail to consider the ramifications of users' distress.

"When humans confront rapid change, they get frustrated, freeze up, get rigid and rebel against the changes. They aren't as adaptable as IT expects them to be," says Marianne Hedin, research manager at IDC's Consulting Services Research Program and author of the report, "Change Management: An Analysis of Market Trends, Growth, and the Com-

petitive Landscape," published in November. "IT professionals tend to see things in black and white, and in change management, there's a lot of gray area. It's about emotions — anger, anxiety and frustration."

Walk the Walk

The best way for an IT professional to get his mind around change management, Cooper says, is to walk a mile in the user's shoes. What if you're a hands-on programmer accustomed to inventing applications from scratch, and your department decides to convert to libraries of reusable code?

"There may be perfectly good reasons for the change, and you will still feel frustrated, power-

less, like your skills aren't as sharp," Cooper says. "All of those are natural responses, which result in the diminished performance of the new system if they aren't managed."

What role can you play in reducing user stress and increasing acceptance of change? The keys, consultants say, are finding business champions for the IT project, including line workers in the development and design of the new system, constant communication about progress, reiteration of the case for implementing the new business process and education and training (see story below).

Finally, remember that you can't separate the three components critical to the project's success: people, processes and technology, says Gary Kissler, a partner at Deloitte Consulting's Change Leadership practice in Dallas: "The statistics bear out that the cause of the large failures we have seen is a lack of attention to the abstract, touchy-feely things."

Whether IT can lead change management or simply be a partner is up for debate. Since a big IT project such as an enterprise resource planning implementation is likely to be driven by business objectives, some say IT must assist with, but not spearhead, measures to garner acceptance of the new system.

On the other hand, "If you get an IT person to imagine what this process will look like a year after the system implementation and work back from there, there's no reason why IT can't lead change management as much as anyone else," says Dan Cohen, another partner at Deloitte's Change Leadership practice, who is co-authoring a book on change management. "Think about how the system will be used in the future, because then you're not just thinking of the technology, but how the technology is interfacing with people and processes." ■

Goff is a freelance writer in New York. Contact her at lgoff@ix.netcom.com.

Building Blocks to Managing Change

In tandem with creating the business case for a project, identify key end users who will champion the new system and processes. Ally with executives and department heads who see the need and who are strong communicators respected by both peers and line workers. Put them on a steering committee. Select people whose future success at the company is linked to the success of the project.

In the requirements phase, seek input for functionality and user-interface design from line workers, not from just the project champions. Put together a separate team composed exclusively of workers, and meet with them to understand current business processes, how they could be improved, system requirements and requests and the look and feel of the new system.

These team members, in turn, become "minichampions" who take the message into the workforce and become your most eager beta testers.

Maintain regular, frequent and honest communication about the progress of the project. Reiterate the business case for the changes often enough so that it stays on people's minds. Be honest even when it's painful and keep users apprised of delays and failures — let them know when 80% of the solution worked, but 20% still needs more work.

Think of your communication efforts in terms of a political or marketing campaign that aims to persuade, not merely inform. Use whatever means are most appropriate to reach each of the constituencies, from hard-copy executive

briefings to e-mail newsletters for department heads, to coffee cups sporting an official project logo for line workers.

As you are developing the system, keep asking yourself: "What are the implications for the people who are using this system? How will they use it and relate to it?" Stay focused on the integration of the IT component with the people who will be using it and the business processes that will change because of it; if you compartmentalize the three, acceptance of the fundamental changes will take so long that the project will be perceived as a failure.

Sources: Gabriel Cooper, independent consultant, Santa Rosa, Calif.; and Dan Cohen and Gary Kissler, partners, Deloitte Consulting's Change Leadership practice, Dallas.

— Leslie Goff

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Dear Career Adviser:

I am a project manager at a large electric utility where I've been employed for 15 years. My career has become stagnant, and I'd like to move into another industry where I can get involved in managing e-commerce development. Most advertised project manager positions require

technical experience in newer technologies. It's been a long time since I've done any hands-on technical work. How do I acquire such experience without stepping down from my current position?

— TARGET ME FOR E-COMMERCE

Dear Target Me:

As an "energy geek," you'll be valuable to utility companies moving toward the Web, since e-skilled utility people also need to know traditional industry skill sets inside and out to integrate them with new Web-based applications. This requires the skills of the old enterprise crowd, asserts John Gaus, CEO and co-founder of Enermetrix.com in Maynard, Mass.

So don't discount your current computer information regarding metering, billing, accounts receivable and accounts payable systems. Just become aware of what else is going on in your industry so

you know how to apply what you already know in this newer context.

Because most utilities are now creating e-commerce projects and budgets to encompass a host of jobs, everything from customer service, to data sharing of account information for customers that choose third-party projects, to commodity transaction management wholesale/retail is up for grabs.

Dear Career Adviser:

I'm in my mid-30s and have been in IT for just three years, preceded by 10 years of accounting systems background. I'm now a freelance consultant to retail companies setting up their LANs (under Novell 3.12-4.0 and Windows NT 4). I want to consider myself at the forefront of systems integration, including Web-based services and e-commerce with a strong knowledge in systems design and programming.

What do I need to add to my background so an e-commerce company will hire me?

— NEED TO KNOW

Dear Need to Know:

You'll need two to three years of work focused on developing the hard-core skills of e-commerce, says Salim Khalife, founder and president of Paramount Technologies Inc., which provides Web-enabled business-to-business e-commerce solutions for small to midsize companies.

Concentrate on Crystal Reports, SQL Oracle or Microsoft SQL Server, and gain strong knowledge in HTML, the Internet programming language, and XML, the content tagging language. Then make sure you have a good understanding of Web browser and server concepts as well as the client/server model. Finally, you'll need strong Microsoft Access for

importing and exporting data from different databases, experience in Web markup languages like Microsoft Active Server Pages or Allaire ColdFusion HTML, a good understanding of electronic data interchange as well as Open Buying over the Internet. Once you have these applications and experience, target traditional consulting companies with e-commerce practices or those high-flying online procurement organizations.

Dear Career Adviser:

I have more than 12 years' experience in the IBM main-frame arena, working with databases such as DB2, IMS and IDMS. Our organization is migrating to Sun Solaris servers, using PeopleSoft and Oracle.

I am enrolling in an Oracle certification program to become an Oracle Certified Professional in database administration. I am taking computer-based training classes such as Oracle PL/SQL, Oracle database administration, Unix, Visual Basic, C and Java. This is prior to enrolling in the certification program for Oracle.

Could you give me some advice about how to find employment as an Oracle database administrator?

— ORACLE DEB



FRAN QUITTEL is an expert in high-tech careers and recruitment. Send questions to her at www.computerworld.com/career_advisor.

Dear Deb:

Of course, you could stay involved with traditional applications. Better yet, consider this: If your ultimate goal is to use your experience in back-end systems with companies moving their business to the Internet, be-

come deeply involved with your company's migration plan, says Toni McIntosh, director of human resources at Pervasive Software Inc., a Web applications development company in Austin, Texas.

Because Web applications are often very database-intensive and both Oracle Corp. and PeopleSoft Inc. have announced widespread Web/Internet integration initiatives with their latest releases, expand your knowledge base to include new Oracle database, Unix and programming language skills. Once you understand the ins and outs of migrating applications to a Sun/Oracle/PeopleSoft platform from hard-core experience, then leverage yourself into consulting work or into a start-up. ▀

BRIEFS

Suit, Countersuit

MP3.com Inc. has filed suit in San Diego Superior Court against the Recording Industry Association of America and the organization's president and CEO, Hillary Rosen, charging unfair business practices. The complaint comes on the heels of a copyright infringement suit filed in January by the industry trade association against the Web-based music distributor and promoter.

IT Consulting Deal

CGU Insurance Co. and information technology consulting firm Keane Inc. have inked a four-year deal that

calls for Keane to provide application outsourcing services to the Boston-based insurer. Financial terms of the deal weren't disclosed.

Auction Fraud

eBay Inc. has begun using technology from Austin, Texas-based InfoGlide Corp. to detect fraudulent activity among its 10 million users and thousands of transactions per day. San Jose-based eBay recently used the technology to help snare a phony \$10 million bid for the Web site www.year2000.com, which is partly owned by Y2k guru Peter de Jager. Details of the agreement weren't released.

Multiyear Domain Registration Service

Network Solutions Inc. is offering a multiyear registration service. The Herndon, Va.-based domain name registrar is offering 15% rebates through Feb. 18 for registration renewals of between two and 10 years. Network Solutions said Amazon.com Inc., Nasdaq Stock Market Inc. and Boston-based New Balance Athletic Shoe Inc. have chosen the multiyear registration service.

Staples Outsources Tech Support

Office supply retailer Staples Inc. in Framingham, Mass., awarded a contract to British IT services firm Inter-

national Computers Ltd. (ICL). The contract calls for ICL to manage computer configurations, installations and support services at almost 1,000 Staples stores in the U.S. and Canada. Additionally, ICL will provide help desk, procurement and consulting services, including project management and systems integration.

Space in Trucks Up for Auction

TradingDynamics Inc., a provider of business-to-business Internet trading applications in Mountain View, Calif., has teamed with Atlanta-based CarrierPoint, a digital marketplace for the trucking industry that creates auctions to match trucks with the loads to fill them. Shippers and carriers will be able to connect online to negotiate the

transfer of goods across all industries, the companies said.

HP, Others Fund Kids' Net Service

San Francisco-based start-up SilverTech Inc. is preparing to launch a private Net service aimed at kids. EKids Internet, which will go live March 1, will post "kid-safe" Web content, cartoons and games organized by four age groups. Members will log on to the network using proprietary software provided by SilverTech. Revenue for the advertisement-free site will come from a \$12-per-month subscription fee as well as from several corporate sponsors, including Hewlett-Packard Co., Cisco Systems Inc., Sony Corp., ITV Media and Encyclopaedia Britannica Inc.

E-Business Services *BRIEF*

SMARTsourcing for E-Business

The evolution of outsourcing

Wendell Jones is a senior IT executive and a leading practitioner of outsourcing as a customer and service provider. He is an executive advisory board member of BrainStorm Group's SMARTsourcing Conference & Expo Series. Jones is also co-author of Outsourcing Information Technology Systems and Services, recently published by Prentice Hall, and is widely quoted in the industry press.

CW: What are some of the challenges facing business and IT professionals today?

Jones: E-Business is a major challenge because almost every industry is being affected. For brick-and-mortar companies to compete they have to adopt an e-Business capability. Many companies lack the ability or the skill set needed to execute e-Business internally so they outsource, or "SMARTsource."

CW: Why do business and IT professionals need to SMARTsource?

Jones: Companies need to move quickly to create an e-Business capability to keep pace with their rivals. Companies must go outside to get another party that can create an e-Business and operate it for them. Many companies realize that owning their own resources is more of an inhibitor than it is a contributor to business agility. Many dot-coms and other newly emerging companies, for example, are leveraging external resources through outsourcing alliances and partnerships — they aren't creating their own internal resources.

CW: What is the difference between e-Business and e-Commerce?

Jones: E-Business is broader and encompasses e-Commerce. E-Business is the use of the Internet and Web technologies to support the internal business operations of an enterprise as well as connectivity with suppliers, partners and customers. It is driving the creation of an entirely new e-Business economy that relies heavily on partnerships, relationships and most importantly, outsourcing.

SMARTsourcing is the evolution of outsourcing to meet the challenges of e-Business.

CW: How does SMARTsourcing fit into e-Business?

Jones: Outsourcing in the IT field has been growing in popularity over the past five to seven years. There is still the traditional outsourcing related to data centers and legacy applications, but the real challenge for most businesses today is developing an e-Business capability to do business electronically.

For any company to do business it has to have an Internet e-Business capability, but there is a shortage of skill sets to do it and a lot of companies don't know how to do it themselves. CIOs need to turn to outside providers to help them put into place the e-Business capabilities and help them to manage and operate that e-Business infrastructure.

CW: Has this changed the CIO's role?

Jones: If you divided up the role of the CIO into three pieces in a pie chart, the pieces would be IT operations, business strategy and management/administrative. Traditionally, the IT operations would be a large piece, maybe three quarters of the pie. Management/administrative would be a smaller piece and then business strategy would be even smaller. Today e-Business has impacted every business unit of the organization and certainly most industries.

The role of the CIO is changing where IT operations is still important, but the business strategy role has grown much larger and is now the largest piece of the pie. Today, the CIO is very much up on deck with the captain of the ship, looking out, studying the vision, studying the direction and helping to keep the ship going in the right direction — or changing course rapidly if need be. The CIO used to be down in the engine room stoking the engine. Charting business strategy and vision is now the most critical role for the CIO.

CW: What can business and IT professionals gain from attending this conference?

Jones: Attendees can expect to leave BrainStorm Orlando with an e-Business game plan: a mindset for strategy development, a road map for implementing their vision and the tools for selecting and managing a virtual team. These lessons will be demonstrated throughout the conference in real-world, end-user case studies.

E-Business Capabilities Key to Future Success

The rules of the game have changed. No longer can a company do everything itself. Future success will come to those capable of drawing together the best mix of business, technical and creative individuals. However, choosing the right strategic partners has become increasingly difficult given the myriad of self-proclaimed "e-Business experts."

SMARTsourcing is the evolution of outsourcing to meet these new challenges. It is about gaining access to e-Business capabilities from world-class solution providers. The end result is greater than the sum of its parts.

The SMARTsourcing Conference & Expo Series is the only forum that provides business and IT decision-makers with comprehensive coverage of the entire services landscape from e-Business outsourcing to traditional IT outsourcing services.

Held concurrently with our e-Business Strategy Conference Series, these events provide conference attendees with all the tools necessary to ensure the success of their e-Business initiatives from vision to implementation.

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TECHNOLOGY

WIN 2K: LOOK BEFORE YOU LEAP

Windows 2000 offers improved stability, security and scalability over Windows NT 4.0. But the headaches include incompatible applications, redesigning networks and running a mixed Windows NT and Win 2k environment. We offer a detailed road map for whether and how to migrate to Windows 2000. **▶ 68**

GREEN SCREENS FOR WIN 2K

Windows 2000 might be the cutting edge, but users still need access to legacy applications. That's why NetManage plans support for Microsoft's SNA server and WRQ Inc. is releasing one of the first terminal emulation products for Windows 2000. **▶ 60**

ANALYZE THIS APPLICATION

When tinkering with applications, it's all too easy to unintentionally write code that could crash your database. CAST Software's Workbench helped at least one customer conduct an impact analysis, which prevented such a problem. **▶ 62**

ERP DATA WOES

Redesigning business processes is often the hardest part of an ERP project. But for many manufacturers, converting the production data in their existing systems can also be a huge challenge. Steelcase,

a \$3 billion office furniture maker, is a prime example. **▶ 60**

BIGGER BUCKS, SMALLER STUFF

President Clinton has asked Congress for an 84% boost in funding for nanotechnology, which could produce molecule-size computers. But experts warn the technology is decades away from having major effects on IT. **▶ 63**

ONLINE DOC MANAGEMENT

Driven by the demands of Web commerce, document management is becoming an enterprisewide application. Key vendors are adding capabilities to their flagship content management products for online operations. **▶ 62**

EMERGING COMPANIES

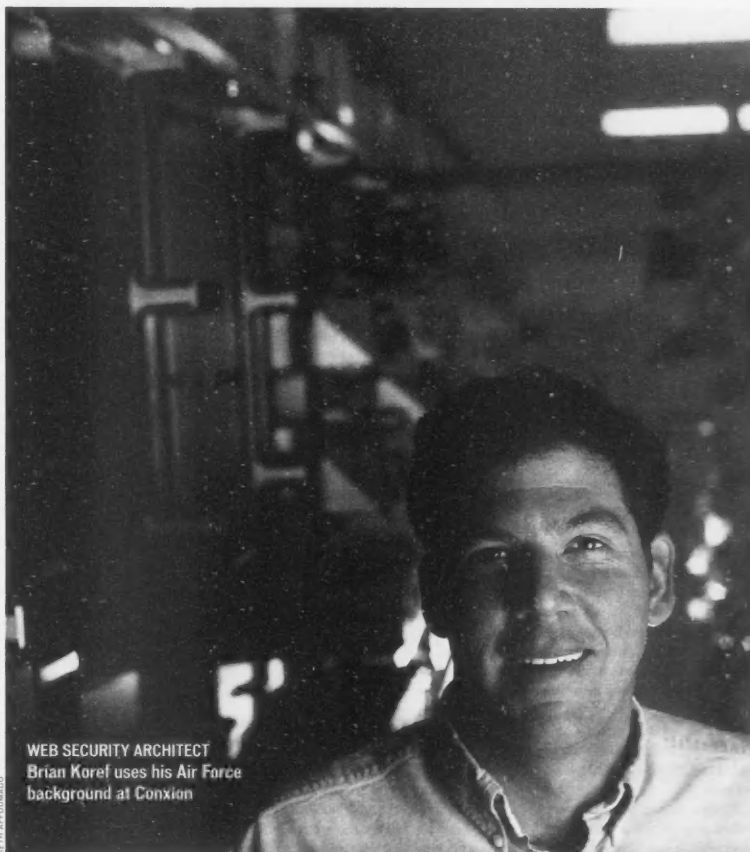
Metagon Technologies LLC ties disparate, sometimes even outdated databases into a single, uniform structure that can be easily controlled. **▶ 76**

DISPOSABLE PC?

Compaq's small, spiffy iPaq redefines what you really need in a business computer. Reviewer Russell Kay says he found it designed for manageability, built for maintainability and priced for affordability. See Hands On. **▶ 64**

MORE

QuickStudy 66
Job Watch 82



WEB SECURITY ARCHITECT
Brian Koref uses his Air Force background at Conxion

SECURITY IN THE TRENCHES

BEING A WEB SECURITY ARCHITECT sounds glamorous. But it can be tedious and frustrating working with imperfect technology — not to mention imperfect people who often don't understand security. But with a shortage of skilled security experts, the prospects for such jobs are good. Check out this emerging career path in Job Watch.

82

BRIEFS

Lucent Buys Cable TV Equipment Vendor

Voice and data network equipment builder Lucent Technologies Inc. in Murray Hill, N.J., has announced that it will purchase Ortel Corp., an Alhambra, Calif.-based maker of optoelectronic components for cable TV networks.

Lucent said the \$2.95 billion stock deal will allow it to utilize Ortel's technology to accelerate the transition of cable TV from a one-way broadcast venue to a two-way interactive communications offering.

The acquisition is expected to be completed midyear.

Phone.com Makes Deal to Buy Paragon

Redwood City, Calif.-based Phone.com Inc., which makes software that enables Internet connections via wireless devices, has announced plans to buy Paragon Software Ltd., a British company whose software allows wireless phone users to move information to and from their PCs.

The deal, which is expected to close during the first quarter, is valued at approximately \$500 million in stock.

Paragon Software shareholders will receive 3.6 million Phone.com stock shares, in addition to \$7.6 million in cash. Phone.com said the acquisition will provide added value to its Wireless Application Protocol software.

Tripp Lite Unveils New UPS Systems

Tripp Lite, a Chicago-based maker of uninterruptible power supplies, has introduced new online uninterruptible power supply (UPS) systems that it said provide better online power conditioning and reliability at a lower price than competitors' products.

Pricing for the new Unison UPS systems in the 1,000 to 2,200 volt-ampere range begins at \$799.

In a separate announcement, Tripp Lite said it has been chosen by IBM to build and sell UPS systems under the IBM brand name. Tripp Lite said eight such systems will be introduced later this year.

ERP, Production Data Can Be a Messy Mix

Converting manufacturing rules to new SAP system is a heavy load for Steelcase

BY CRAIG STEDMAN

REDESIGNING business processes is often the hardest part of an enterprise resource planning (ERP) project. But for many companies — especially those that make a complex mix of products — just getting their existing production data into the new system can also be a huge challenge.

Product numbers, configuration options and manufacturing bills of material kept in different legacy systems need to be made consistent and converted into a format that the new ERP software can understand. And that requires careful planning, lots of manual gruntwork and plenty of testing, analysts said.

Take Steelcase Inc., a \$3 billion maker of office furniture. Six years after it first bought SAP AG's R/3 ERP system, the Grand Rapids, Mich., firm is finally getting ready to use the applications to run the bulk of its order-processing and materials management operations.

Data Challenge

From a technology standpoint, "the biggest challenge we have is loading our product data" into R/3 from a mix of homegrown mainframe systems, said Paul VandeVusse, director of application development at Steelcase and head of its R/3 installation team.

Steelcase has more than 60,000 unique product numbers spread across multiple categories of furniture. Configuration options abound, and the mainframe programs are filled with hand-coded logic that contains rules for creating the lists of parts needed to make products.

"There's a lot of data in our legacy systems," said Dick Reimink, technology leader on a related project in which Steelcase developed architectural design software that uses a

product configuration tool released by SAP last year.

Steelcase was the first user to install the Internet Pricing Configurator, which runs as part of an application that lets furniture dealers design offices for a new product line called Pathways. IntelliCorp Inc., a Mountain View, Calif., vendor that co-developed the configurator with SAP, also helped Steelcase implement the technology.

Now, the design software needs to be integrated with the R/3 system so orders for Path-

ways products can be processed and built, Reimink said.

To simplify the data-conversion job, VandeVusse said, Steelcase plans to switch to R/3 on a plant-by-plant basis. The first site is due to go live later this year, but it could take another three years to convert all 30 of the company's North American plants.

Such data conversions are fraught with peril for just about any manufacturer and even some companies in service industries, said Joshua Greenbaum, an analyst at Enterprise Applications Consulting in Berkeley, Calif.

And though some tools can help with the conversions, there usually "is no magic bul-

Big Numbers

Steelcase's R/3 system will have to track:

- Thirty manufacturing plants that make a sprawling assortment of products, ranging from office accessories to fully integrated furniture systems.
- More than 60,000 product numbers with unique configuration options that customers can select when planning orders.
- About 200,000 manufacturing bills of material that are needed by plants to build those products.

let to this," he added.

Nor is the challenge specific to R/3, said Michael Bittner, an analyst at AMR Research Inc. in Boston. "I don't care what [ERP system] Steelcase picked," he said. "They still would have had these issues."

Win 2k Gets Terminal Access

NetManage, WRQ both plan new tools

BY LEE COPELAND

Described by one analyst as a "big-time" boost to integration for Windows applications, NetManage Inc. has announced plans to incorporate Microsoft Corp.'s terminal-connectivity software into its application-integration tool set.

Cupertino, Calif.-based NetManage plans a version of its OnWeb e-commerce integrator application server with support for Microsoft's forthcoming SNA server, code-named Babylon. The software

will provide connectivity between Windows applications and 3270 host applications and databases.

NetManage officials said the ability to extract data from Microsoft Transaction Server applications and Customer Information Control System-based applications will be a key benefit of the server. NetManage added that the partnership will also result in products to link Windows desktops to back-end systems running Unix.

Users would access the data from Windows applications or from a Web browser. Both Babylon and NetManage's server will be released this fall. Pricing hasn't been set.

Darcy Fowkes, an analyst at Aberdeen Group Inc. in Boston, said the initiative will aid developers looking to integrate Windows applications with back-end systems.

"This functionality will allow companies to get into Unix and back-end 3270 applications seamlessly from the Windows desktop," Fowkes said.

In related news, WRQ Inc. plans to release updates of two of its host access tools this week, including what the Seattle-based company said are

among the first terminal emulation products to support Windows 2000.

WRQ spokesmen said Reflection 8.0 will provide faster terminal emulation than its predecessor and support key features in Windows 2000 such as Active Directory. That will allow information technology managers to control access levels to the host environment and multiple, roaming users, they said.

Reflection for the Web 3.0 and Reflection for the Web Professional Edition 3.0 are Java-based Web-to-host access tools built on a component architecture. Officials said this will allow users to download only needed components, helping speed performance.

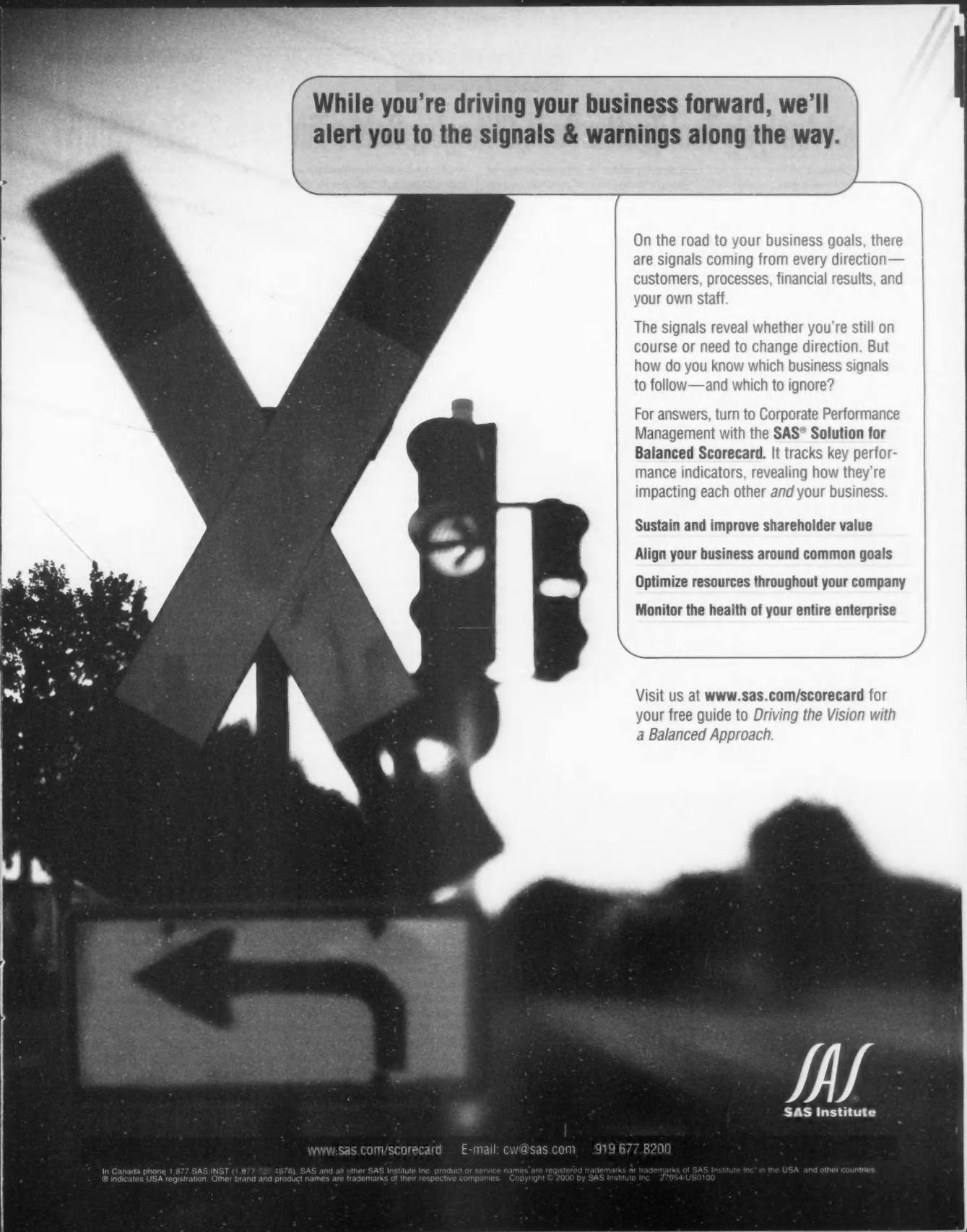
The professional edition also will include application programming interfaces for creating log-on scripts and dialog boxes in Java, JavaScript, VBScript and HTML.

Both Reflection 8.0 and Reflection for the Web 3.0 will support connectivity between Windows 2000 and IBM mainframes, AS/400, OpenVMS, Hewlett-Packard Co., Unix and X Windows operating system environments. Pricing for Reflection for the Web starts at \$199 per license and \$115 per user. Reflection 8.0 pricing starts at \$132 per user. ■

JUST THE FACTS

NetManage/Microsoft Connectivity Pact

- Support for Microsoft's Babylon SNA server in NetManage application server
- Web browser access to host data and applications
- Connectivity to CICS, Unix systems and Microsoft Transaction Server



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Impact Analysis Tool Tracks Code Changes, Saves Time

BY ROBIN ROBINSON

For Jennifer Hurd's group at Horizon Management Group LLC in Boston, looking at the potential impact of code

changes created a map between the group's database and application that looked like a fireworks display.

Hurd and her colleagues use Power-

Builder to develop applications that access a Microsoft SQL Server 6.5 database. They found that uncovering the impact of even simple changes could take two to three hours. That included searching through stored procedures, which are programs stored within the database, and triggers, the code that executes those stored programs.

Hurd, a development manager, had to rely on the memory of programmers. "But if they forgot something, you have problems," Hurd said.

Such problems aren't unique to Horizon. Most organizations rely on employees' memories or manual records, said Carl Zetie, an analyst at Giga Information Group Inc. in Santa Clara, Calif.

Unique Capability

There are tools that can do impact analysis for databases and applications, Zetie said, but most require developers to trace any potential code change throughout the application, do the same analysis on the database and manually reconcile the two. Zetie said San Francisco-based Cast Software Inc.'s Workbench is the only one he's seen that traces the impact of changes between the application and the database.

"You can pick apart the [code] in the database that is used by the client/server application. That is bordering on the impossible without Cast," Zetie said.

The tool supports applications built using PowerBuilder, Visual Basic and Oracle Forms 6.0, along with Java, C++, JavaScript and HTML. A tool like Workbench is especially useful in analyzing code created with such fourth-generation languages, said Zetie. That's

[With Workbench], you can pick apart the [code] in the database that is used by the client/server application.

CARL ZETIE, ANALYST,
GIGA INFORMATION GROUP

because fourth-generation tools mask important details such as the links between the application and the database, he added.

Horizon, a subsidiary of Hartford Life Insurance Co., started using Workbench last April. Running the Workbench tool against the PowerBuilder application and SQL Server database produced a list of code affected by a change in 20 minutes. That would have taken a developer two to three hours to do manually, Hurd said.

"You still need to do some analysis on your own," Hurd said. But Workbench makes that process easier as well by including several lines of the surrounding code to provide a context for developers to review as they determine their course of action. "It makes it drastically easier for the four or five people on the development team, but also, you know where that object is referenced, so you have a further degree of certainty that you got it all," Hurd said. ▀

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SNIP ALONG THIS DOTTED GUIDE TO NEATLY FASHION A PORTABLE MEMENTO IN RECORD TIME.

Vendors Boost Web Doc Support

*New management tools
handle more file formats*

BY LEE COPELAND

To better support online commerce and customer service initiatives, document management vendors are offering beefed-up Web content-management tools.

IntraNet Solutions Inc. in Eden Prairie, Minn., last week launched a Web content-management tool called Xpedio Web Asset Management (XpedioWAM). The tool will handle a wide range of document formats, including HTML, the XML content-tagging language, Portable Document Format files, Active Server Pages and JPEG

images. It also will allow documents to be archived, searched and published from a Web browser.

XpedioWAM includes enhanced search tools for finding Web documents and an archiving feature that allows webmasters to archive specific Web site configurations, according to IntraNet Solutions officials.

Control-valve maker Fisher Controls International Inc. in Clayton, Mo., uses IntraNet's document management product, IntraDoc, to provide its global manufacturing and sales offices access to thousands of engineering documents via an intranet.

Mark Heindelman, the manager of

AT A GLANCE

Web Needs

■ Enterprise applications accessed via Web browsers and other clients

■ Repository and content management for Web documents, such as XML and HTML

■ E-commerce integration support

The First Disposable PC?

BY RUSSELL KAY

IT LOOKS LIKE a dictionary stuck between two thick bookends, but Compaq Computer Corp.'s newest business PC, the 10-lb. silver-and-gray iPaq, signals a coming revolution in corporate computer buying, where desktop hardware matters much less than software and network infrastructure. The nifty little iPaq is a brand-new class of computer — inexpensive but not cheap, thus easily affordable and replaceable. It's here today, and it's a bargain.

First, some specifications. The \$499 base machine has a 500-MHz Celeron processor, 64MB of RAM and a 4GB hard drive. There's no floppy drive. Ethernet is standard. Options include a Pentium III CPU, more RAM and bigger hard disks. A vertical bay on the left side accepts an extra-cost hot-swappable drive — CD, digital video disc, LS-120 SuperDisk or second hard drive — all of which can also be used in Compaq's Armada notebooks. The back panel comes in two forms: standard and legacy-free. The standard model has the usual array of connectors: serial, parallel, keyboard, mouse, Ethernet, video and a couple of Universal Serial Bus (USB) ports. The legacy-free model has just video, network and three USB sockets. Both have headphone, microphone and two USB connections on the front panel.

The standard model addresses concerns expressed by information technology managers that they still have a lot of older peripherals they want to use [News, Nov. 15]. But over the next year, I expect the legacy-free to overtake the standard as the preferred model.

At these prices, you don't get any applications, but that's not a big issue for large organiza-

tions, which typically have site licenses for their principal software. Operating systems do matter, and here you get some choices. The legacy-free model is Windows 2000-only, but the standard model comes with your choice of Windows 9x, NT or 2000.

I tested a standard iPaq with the Celeron processor, 128MB of RAM, an 8GB hard drive, a CD-ROM drive and Windows 2000, which priced out at \$784. Adding an LS-120 drive and a USB 56K bit/sec. modem would bring the total to \$962. That's nearly double the entry-level price, but it's still a lot of PC for the money in a package that gives you back a good chunk of your desktop.

In use, the iPaq was like any other modern commodity PC;

it worked as expected. One noticeable difference: I've never before gotten a computer working out of the box as quickly as I did this iPaq. My only real criticism is that the CD-ROM drive gave an annoying buzz while I was installing Office 2000. On the other hand, it played audio CDs with no buzz, and sound from the front-panel speaker was unexpectedly good. The keyboard features seven programmable function buttons. The up-front USB ports were a real convenience for hooking up peripherals like a digital camera or scanner.

The Business Box

The iPaq was clearly designed with the enterprise in mind. It comes with a customized version of London, Utah-based Altiris Inc.'s PC Transplant that is specifically designed to capture all the settings and personalizations of a user's PC and transfer them to any Compaq machine. It also comes with a free 30-day license to use Altiris eXpress, a disk-imaging utility that will simplify setup of new units by IT staff.

Maintenance is very simple. Just push down on the top of the right side panel and lift it off (see photo) to get at the



The sleek, small iPaq may be all the computer most corporate users will ever need... and prices start at \$499

hard drive and the two DIMM (dual in-line memory module) slots. That's access enough, because those two items are about all you're likely to want or need to fiddle with inside the box; everything else plugs in from the outside. You can fault the iPaq for not being expandable, because there are no expansion slots inside. But it's complete enough, and that may actually be an advantage for IT.

The iPaq comes with a one-year warranty and, more important, with Compaq's guarantee that all configurations will be available and stable for a full year after introduction, with no changes to internal components. Since a year now represents about two marketing generations of computer models, the iPaq offers a promise of platform stability that IT managers will appreciate. You can buy the iPaq only directly online at www.compaq.com/buynow/online.html.

To me, the iPaq represents the start of a new era in business computing. It's powerful enough for everyone but serious gamers, engineers, scientists and graphics professionals. And it's so inexpensive,

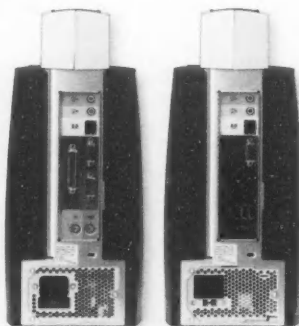
you can write off its cost in a year and replace it if you must.

No More Beating the Clock

Over the past two decades, the speed race among CPU makers meant that IT almost automatically upgraded business PCs every two or three years. But we've now discovered that most users just don't need faster computers anymore. You can get a lot of word processing, spreadsheet, e-mail and other business done with a 233-MHz CPU, for example.

Five years ago, it made sense to upgrade most users periodically to a computer that was two to three times faster. But today's mainstream CPUs spend most of their time running on idle. At long last, IT can start thinking about keeping PCs longer.

In my judgment, the iPaq is just right for the times. Bargain-priced, designed to be managed and maintained simply, the iPaq should be a real success. We'll see similar machines from other vendors (Hewlett-Packard Co. will soon announce a new model), but Compaq is first to market, and it looks to me like it's done just about everything right. ▀



The iPaq comes in two forms: standard and legacy-free, with different ports

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VLIW Microprocessors

BY TOM R. HALFHILL

WHEN Transmeta Corp., a 5-year-old Santa Clara, Calif.-based start-up in the CPU business, revealed its new Crusoe family of processors last month, experts weren't surprised to learn that the chips are based on Very Long Instruction Word (VLIW) technology.

For one thing, Transmeta's patent disclosures had tipped the secretive firm's hand more than a year ago. But beyond that, VLIW has become the prevailing philosophy of microprocessor design, eclipsing older approaches such as RISC and complex instruction set computing (CISC).

The Quest for Parallelism

All microprocessor designs seek better performance within the limitations of their contemporary technology. In the 1970s, for example, memory was measured in kilobytes and was very expensive. CISC was the dominant approach because it conserved memory.

In a CISC architecture such as Intel Corp.'s x86, which was introduced in 1978, there can be hundreds of program instructions — simple commands that tell the system to add numbers, store values and display results. If all instructions were the same length, the simple ones would waste memory. Simple instructions require as little as 8 bits of storage space, while the most complex consume 120 bits.

Variable-length instructions are more difficult for a chip to process, though, and the longer CISC instructions are especially complex. Nonetheless, to maintain software compatibility, modern x86 chips such as Intel's Pentium III and Advanced Micro Devices Inc.'s Athlon must still work with all troublesome CISC instructions that were designed in the 1980s, even though their original advantage — memory conservation — isn't as important.

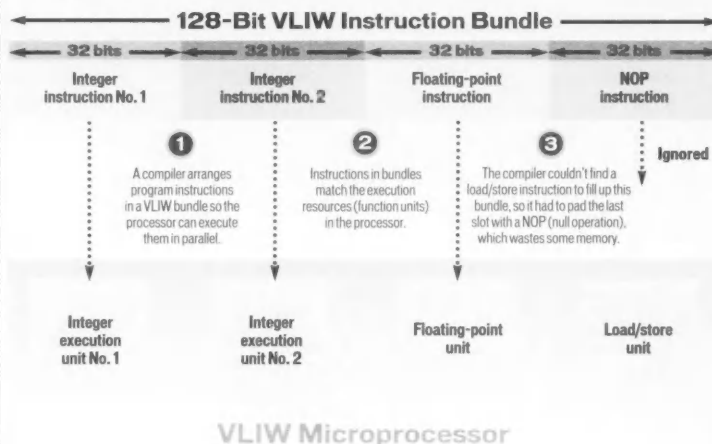
In the 1980s, RAM chips got bigger and bigger in capacity

DEFINITION

Very Long Instruction Word (VLIW) is an increasingly popular approach to microprocessor design. This type of CPU chip uses long, fixed-length instructions made up of several shorter-length instructions that execute in parallel. VLIW differs in several important ways from older approaches such as CISC and RISC. Most new microprocessor architectures announced recently are based on VLIW principles.

The Basics of VLIW

This generic illustration doesn't describe all VLIW architectures, but the concepts are similar: multiple instructions per bundle, arranged by a compiler for parallel execution by the processor. A flaw in some VLIW architectures is that the compiler must pad unused instruction slots with null operations — dummy instructions that do nothing but still occupy memory. Some VLIW architectures solve this problem by varying the size of the bundles or by using other techniques.



while their prices dropped. The emphasis in CPU design shifted to raw performance, and RISC became the new philosophy. Examples of RISC architectures include SPARC from Sun Microsystems Inc.; the MIPS Rxxxx series from Mountain View, Calif.-based MIPS Technologies Inc.; Digital Equipment Corp.'s Alpha; the PowerPC, which was jointly developed by IBM and Schaumburg, Ill.-based Motorola Inc.; and Hewlett-Packard Co.'s PA-RISC.

RISC chips use a rather small number of relatively simple, fixed-length instructions, always 32 bits long. Although this wastes some memory by making programs bigger, the instructions are easier and faster to execute.

Because they have to deal with fewer types of instructions, RISC chips require fewer transistors than comparable CISC chips and generally deliver higher performance at similar clock speeds, even though they may have to exe-

cute more of their shorter instructions to accomplish a given function.

The simplicity of RISC also makes it easier to design superscalar processors — chips that can execute more than one instruction at a time. This is called instruction-level parallelism, and it's the Holy Grail of CPU architects. Almost all modern RISC and CISC processors are superscalar. But achieving this capability introduced significant new levels of design complexity.

VLIW is the latest way to simplify processors. VLIW chips don't need most of the complex control circuitry that superscalar chips must use to coordinate parallel execution at runtime. Instead, VLIW chips shift more of that burden onto compilers.

The software development tools that programmers use to compile their programs into executable code are responsible for arranging the instructions in the most efficient manner.

Also, VLIW chips combine two or more instructions into a single bundle or packet. The compiler prearranges the bundles so the VLIW chip can quickly execute the instructions in parallel, freeing the microprocessor from having to perform the complex and continual runtime analysis that superscalar RISC and CISC chips must do.

No Free Lunch

VLIW chips can cost less, burn less power and achieve significantly higher performance than comparable RISC and CISC chips. But there are always trade-offs. One is code expansion — programs grow larger, requiring more memory. Far more important, though, is that compilers must get smarter. A poor VLIW compiler will have a much greater negative impact on performance than would a poor RISC or CISC compiler.

But even with the best compilers, there are limits to how much parallelism a VLIW processor can exploit. A good RISC or CISC design might do just as well with the software that most users run.

VLIW isn't a magic bullet, but it's the new wave in microprocessor design. Within a few years, it's certain that at least some of your software will be running on VLIW chips. ■

Halfhill is a microprocessor analyst at Cahners Micro-Design Resources and is a senior editor at "The Microprocessor Report." Contact him at halfhill@mdr.cahners.com.

What Constitutes a "Killer" Application Server?

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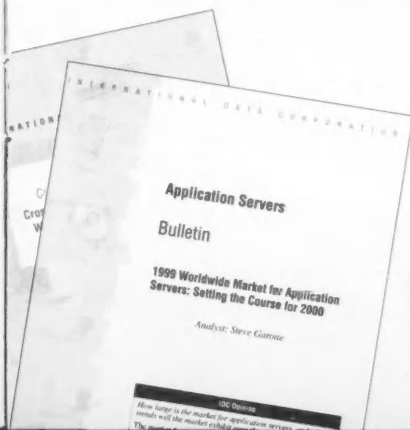
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Windows 2000 may be the enterprise OS of choice ... eventually. For now, analyze the business case for migrating and test, test, test.
By Cynthia Morgan

The Road

Is Windows 2000 Right for Your Entire Enterprise?

Windows 2000 beats NT 4.0 in four important areas: management, stability, security and scalability. But to take full advantage, you must migrate a substantial part of your enterprise to the new operating system, a time-consuming – and expensive – operation that may be hard to justify in the near term.

Answer the questions in this decision map to help determine whether you should consider migrating your entire network – clients and servers – to Microsoft's new Windows 2000 operating system. Running into a "WAIT" icon means you'll need to do further testing and possibly upgrade systems and software before you migrate to Win 2k. Hit a "STOP" sign? You'll have a difficult time justifying a full Win 2k migration at this time unless you make substantial changes to your infrastructure or are willing to forgo features missing in the debut version of Windows 2000.

STOP

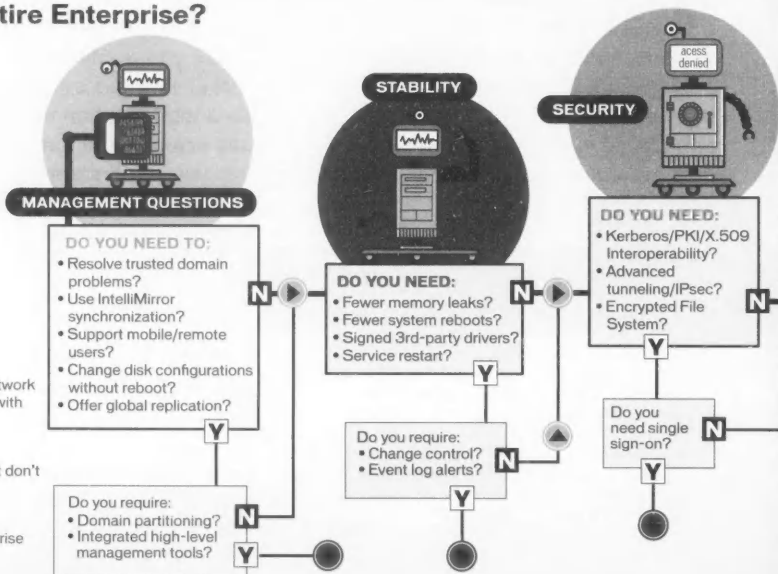
You require features/options that Win 2k doesn't offer, or your network doesn't meet Win 2k requirements for full implementation. Stick with your present environment or investigate non-Win 2k options.

GO

Your requirements and/or infrastructure so far support – or at least don't reject – a migration to Win 2k.

WAIT

You must upgrade hardware/software components of your enterprise before Win 2k can be fully implemented.



THIS WEEK, Windows 2000 finally hits the streets, accompanied by massive hype and, if *Computerworld* readers are any indication, a cautious wait-and-see attitude from corporate information technology shops.

Wholesale migration is almost certainly not the answer for the vast majority of U.S. corporate networks, and not even Microsoft Corp. is claiming it should be for now, says John Enck, research director at Stamford, Conn.-based Gartner Group Inc.'s Hardware and Operating Systems division. But there are benefits to a Win 2k migration that justify strategic upgrades to

servers, mobile clients and sometimes corporate desktops.

Companies that will migrate to Win 2k from Windows NT will do so to gain enhanced management of local and remote resources, better stability, increased security and improved scalability. Enck and other analysts say that if your company isn't hurting in at least one of those areas, chances are it'll be difficult to justify the expenses of upgrading to Windows 2000.

Performance-tuned features like a greatly improved TCP/IP stack will be a godsend for IT managers such as Peter Meister at American Farm Trust in Washington. "We've seen a 40% to

70% gain in relative Internet speeds under Windows 2000," he says. "That alone is worth the price of admission for us."

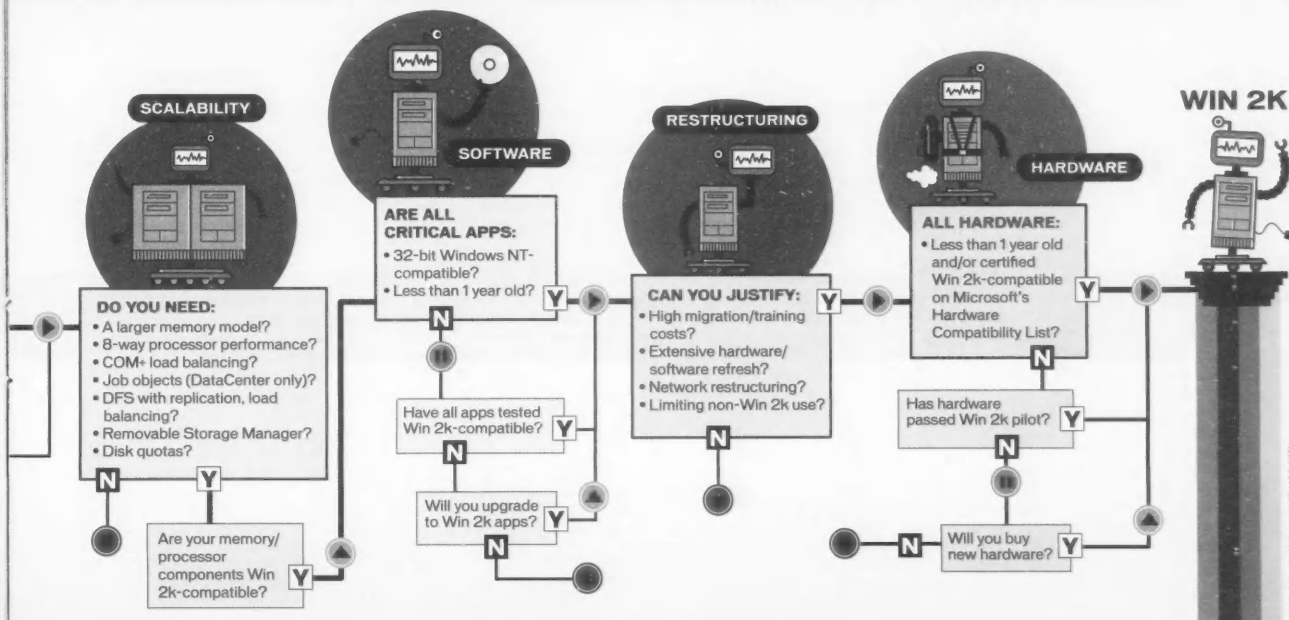
Meister's organization is unusual because it plans to migrate its globally scattered enterprise to Win 2k almost immediately. Meister says the transition will be a relatively easy one because within the past year, American Farm Trust converted entirely to a thin-client architecture using Fort Lauderdale, Fla.-based Citrix Systems Inc.'s MetaFrame. Most of the infrastructure is less than six months old, he says, and the centralized management capabilities inherent in thin-client sys-

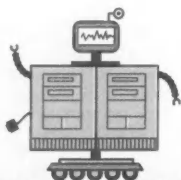
tems greatly speed deployment.

That won't be the case for most large organizations, Meister concedes. "If you're implementing Windows 2000 on legacy infrastructure, you just can't do a wholesale migration," and that makes Win 2k much less compelling, he says. "You'll see some improvement in performance and administration, but it will be minimal. You'll have to wait until you can bring most of your network on board before you get the real benefits."

This story draws on two years' worth of *Computerworld* interviews, user case studies, surveys and in-house Win 2k, page 70

to Win 2k





Win 2k

Continued from page 69
testing to help determine when and why to move to Windows 2000.

Management

"Trusted relationships in domains hardly ever worked, and when they did work, we had security problems, user management problems, all sorts of trouble," says Steven Sommer, CIO at law firm Hughes, Hubbard and Reed LLP in New York. "Windows 2000 will be a real relief."

"One of the nicest things about Windows 2000 is that it gets rid of all the extra protocol overhead a network administrator has to deal with," says Meister. "With Windows NT, I have to worry about [Microsoft's] NetBEUI [protocol], AppleTalk, IPX/SPX — everything. On my LAN, that means there are high collision rates, which slows everything way down. Windows 2000 purifies the network to solely

TCP/IP, which has reduced my collision rates considerably."

"We also do video telephony over our LAN, so we have to maintain certain levels of bandwidth," Meister says. "Windows 2000 gives us more control over quality of service. I think [quality of service] will be an incredible resource for any large IT shop. In the same vein, Windows 2000 finally gets disk quota services, which let you set limits on user storage amounts. That's really great for us."

Stability

"Windows 2000 is more stable, which is important to a Citrix [thin-client] network," Meister says. "We can't afford to lose a server, because it kills the thin clients. With NT 4, we had your usual NT problems and wound up applying a lot of patches to fix them."

Windows 2000 marks Microsoft's first use of signed drivers — the software that interfaces the operating system with hardware and applications. American Farm Trust is adding digital signatures to drivers that have been certified as fully Win 2k-compatible by Microsoft.

When the operating system encounters an unsigned driver, it will at best warn the user and wait to proceed. At worst, it will refuse to install the driver. That could be a problem for companies with legacy equipment, but it also guarantees that what does install properly is likely to work, says Enck.

Security

"We started with one security manager under Windows NT, but pretty soon we needed two, then three," says Sommer. "With Active Directory, we'll only need one."

Windows NT has come under fire numerous times for its security holes; Windows 2000 is a vast improvement, say most experts. It's the first Windows operating system to provide native support for security standards such as Kerberos and X.509 public-key infrastructure certificates, and to offer an encrypted file system.

"We deal with very confidential donor database information, so that level of security was very important," Meister says. "If my boss wants to be the only one who can access a document, he can secure it under Windows 2000 with no problem. Under NT, that was very hard to do and very easy to overcome."

But right now, Windows 2000 security is an open question, simply because its security features haven't been put into widespread use yet.

Questions remain as to how well Microsoft Kerberos will work with other Kerberos implementations. And a single sign-on feature giving users the ability to be authenticated once to the network and receive access to every authorized service, Windows or not, without additional log-ins, didn't make it into the first release of Windows 2000, Microsoft says.

Scalability

Windows 2000 adds support for up to 64GB of memory and as many as 32 processors, along with better cluster and load balancing. However, you'll need Windows 2000 Data Center edition, which won't be available until late spring, to take maximum advantage of scalability features.

"Clustering and load balancing are especially important when you're running applications from the server, as we do with Citrix," says Meister. "Our users are widely distributed in a [wide-area network] environment, so we see some real advantages in moving all our servers to a clustering architecture."

Scaling data storage has been a particularly hard nut for Windows NT to crack. Windows 2000 could potentially address most of those shortcomings. Microsoft has included a very promising distributing file system with support for replication and load balancing across logical storage volumes. But, Enck says, you'll need to convert your current file system to the new NT File System (NTFS) 5 to take advantage of disk quotas — the ability to set maximum storage capacity for individual users — and other new features. And NTFS 5 may have problems working with NT storage management utilities.

Now for the Hurdles

Chief among Windows 2000 difficulties: high restructuring costs. It'll be Win 2k, page 74

Active Directory: The Heart of Win 2k

OK, we managed to survive the year 2000 thing pretty much intact. Can IT do as well with Win 2k?

After months of living with the new operating system, we've found that one thing is obvious: The biggest headaches for IT managers — especially those most familiar with Windows NT — will be redesigning their networks to support both the new Active Directory and the many servers that will continue to run Windows NT 4.0. This configuration, which Microsoft calls "Mixed Mode Operation," will be far more common and practical for organizations to implement than all-Win 2k.

Unfortunately, mixed mode is also a mixed blessing. Many of the benefits that justify Windows 2000 can be realized only with workstations and servers alike running the new operating system.

Under Windows NT, a network generally consisted of a number of quasi-independent domains, each with several domain controllers, which are servers that keep track of what users and resources are under its control. The user logs in to a particular domain and is authenticated by that domain's primary controller.

The first difficulty arises whenever that user

needs to access a resource or file in another domain. Instead of logging in to that other domain (which would require, in essence, an additional user account), Windows NT networks operate with a system of trust.

Domains are configured so that one domain, which we'll call HereIAm, can have a trusted relationship with another, ThereYouGo. This trust extends to all the users in the two domains, so a user in HereIAm can access a file in ThereYouGo without going through a second log-in process.

Greatly simplified, the result is a network of connected peer domains that share varying relationships of trust. This is fairly simple in principle, but administration can be a headache, requiring separate operations in each domain.

Windows 2000 was designed to scale up to millions of nodes, considerably beyond where NT can comfortably go. Win 2k Advanced Server accomplishes this by offering a finer-grained structure, with more types of elements. The domain is still the fundamental component of the network, as with NT. It collects and maintains related nodes and resources like file servers, printers, Web services, application servers and more.

Active Directory uses a centralized repository

of information about all the components of the network: users, machines, servers, domains, sites, resources and more.

This centralization gives it a lot of power, but at a price. Say you're in Paris and want to send an e-mail to someone on the network in San Diego, but you don't know his full e-mail address. Active Directory knows about him, but you don't want to have to send a query halfway around the world just to look up an address.

It's standard to keep local copies of the Active Directory in a few low-level domain controllers. Keeping those copies current with the master edition back at headquarters requires some sort of replication.

In a really big network, the physical size of the Active Directory becomes an obstacle. You can save some replication time by sending just the changes. Unfortunately, the sheer number of changes required to synchronize directories in very large enterprises is staggering; most directory services wind up storing a lot of redundant information in many locations to save on replication time.

Microsoft's Active Directory takes an interesting approach to this problem. Distributed copies of the central repository, called global

catalogs, don't hold as much information as the central Active Directory. And the approach ensures that the Active Directory contained only necessary information about any network resource, leaving the local copy to maintain more extensive records. So, while full information is retained at the local level, only selected portions are sent to the Active Directory level.

That means all the distributed global catalogs have only selected parts of the Active Directory's central repository.

Sites, which are new to the Windows NT world, are simply practical ways of subdividing an enterprise network based on bandwidth. Let's say a multinational company has significant operations in Europe and the Americas. Offices within Europe communicate pretty well, but bandwidth gets tight when crossing the Atlantic Ocean.

The customer can design its Windows 2000 network with a European site and a North American site. Each site has a full copy of the Active Directory for efficient operation. That reduces the need for Europe to exchange Active Directory updates with North America and reduces the amount of traffic crossing the low-bandwidth connection. — Russell Kay



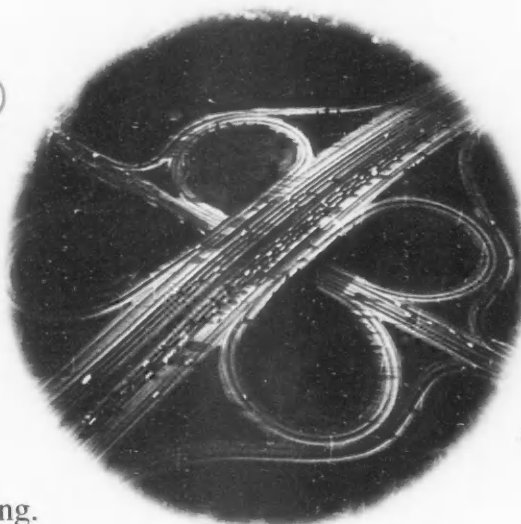
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CHANNELS

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Win 2k



Continued from page 70

a rare network that doesn't require at least some rearchitecting and upgrading, and Gartner's Enck says managers can expect 10% to 15% of their applications to have compatibility problems under Windows 2000. That figure is consistent with the experience of *Computerworld's* technology staff.

"Older infrastructure is going to be the biggest concern for any large shop that wants to move to Windows 2000," Meister says. And incompatibility, especially on the hardware side, gets worse when you move to the top-level data center version.

Active Directory will prove the pivot point in many installations; without it, some of Windows 2000's best features

are missing or limited, at best. But for Active Directory to work properly, it must be installed networkwide, "probably one of the most massive undertakings you'll encounter in a Windows 2000 installation," says Enck. Microsoft's directory interoperability tools focus on eventually migrating the entire system to Active Directory, not working with other directories.

Support staffs face a huge learning curve. "The hardest thing to learn about Windows 2000 is the [organizational unit] schema," Meister says. "NT experts are typically not good at anything Unix, and that includes DNS [the Domain Naming System]. Windows 2000 relies on Dynamic DNS, which is going to be even stranger for people used to working with NT."

"There's a whole new world and really a lot to learn," Sommer says. "Windows 2000 is actually quite simple to deploy, but the work needed before you deploy can be intimidating." ■



“

We've seen a 40% to 70% gain in relative Internet speeds under Windows 2000. That alone is worth the price of admission for us.

PETER MEISTER, IT MANAGER,
AMERICAN FARM TRUST

A Glossary of Windows 2000 Terms

Can't see the forest for the noncontiguous subtrees? Understanding Win 2k terminology might keep your staff out of the woods.

Advanced Configuration and Power Interface (ACPI): A new power-management standard that covers desktop, mobile and server computers as well as their peripherals. It includes "instant-on" features and can activate PCs remotely across the network. Use of ACPI depends on functionality in the system hardware.

Active Directory: Windows 2000's new directory structure, which replaces the older trusted-domain system of Windows NT. Active Directory manages users and network resources, authenticating them to the network and assigning permission and service levels. It forms the backbone of many new features in Windows 2000, such as IntelliMirror and the new authentication procedures.

Attributes: Characteristics of objects. All objects of a given type have the same set of attributes, though the values of a given attribute may differ from one object to another.

Delegated administration: Unlike previous versions of NT, Windows 2000 permits administrators to assign administrative tasks to another user or group without giving it complete access.

Distinguished name: Active Directory's naming scheme follows Lightweight Directory Address Protocol (LDAP) conventions, incorporating the location of the resource in the network from the distinguished name. For example, *Computerworld* user John Smith's distinguished name might be "/O=Internet/DC=COM/DC=Computerworld/CN=CWuser/CN=John Smith." That's too cumbersome for users, so Windows 2000 recognizes the user principal name for most operations.

Domain: The core unit of Active Directory, a container of objects that share security requirements, replication processes and administration. An Active Directory domain can contain millions of objects.

Domain controller: A Windows 2000 server that stores a complete copy of all directory information for a given domain. It also manages changes to directory information and replicates those changes to other domain controllers in the same domain.

Forest: A collection of one or more trees. Multiple trees in a forest don't share common root names, but because all trees in a forest trust one another automatically, they share information.

Global catalog: A partial replica of the Active Directory used to determine the location of any object in the directory. The global catalog includes all objects and their most frequently used (but not necessarily all) attributes. It can be a much more powerful locator than the "Find Computer" command in older Windows versions.

Group: A collection of resources designed to simplify administration so permissions can be granted once to an entire group rather than multiple times to individual users. Groups come in two types - security and distribution groups - and can have a scope defined as domain-local, global or universal. The normal way to organize groups is to put user accounts into global groups, global groups into domain-local groups and then grant resource permissions to domain-local groups. Universal groups can be addressed anywhere in the network.

IntelliMirror: Microsoft's term for Windows 2000 synchronization services. IntelliMirror can synchronize data between local and remote systems or "heal" a corrupted PC by restoring it to earlier configurations.

Microsoft Management Console (MMC): A network management framework that lets administrators plug "snap-ins," utilities that perform specific tasks such as setting group policies or administering a Web site, into a workspace known as a "console." The result is a customized network-management workspace.

Namespace: A document or index that identifies objects in a particular part of the network. A phone book, for example, is a namespace that matches people with their phone numbers. In Windows 2000, a namespace can also be referred to as a console tree.

Native mode domain: A domain where all domain controllers are running Windows 2000.

Object class: The definition of a type of object that can reside in the Active Directory.

Organizational unit (OU): A container object used to organize a domain into logical administrative groups. OUs can contain other objects, such as user accounts, groups and computer accounts. They can also contain other OUs.

Root domain: The domain containing the first domain controller created in a forest.

Site: One or more Internet protocol subnets linked by high-bandwidth connections (at least 10M bit/sec.). Areas of a network separated by wide-area network technologies, multiple routers or other slower links should be defined as separate sites.

Tree: A hierarchical arrangement of one or more domains with a single root name. Domains within a tree share information through automatic trust relationships. Trees can have branches, called subtrees.

Trust: A relationship between two domains that lets one domain automatically accept authentications made by the first. In Windows NT, it was either a one-way or two-way street.

User principal name: The way a user generally identifies himself to the network, as in "jsmith@computerworld.com," as opposed to his LDAP-based distinguished name.

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Database Diplomacy

Metagon Technologies gives users a single view of very different databases

BY AMY HELEN JOHNSON

EVERYTHING the Massachusetts Housing Finance Agency (MHFA) needs to know about its outstanding loans, borrower demographics, loan costs, staff deployment and other information is stored in a SQL Server database. Unless the information is in a Progress database. Or in its legacy VAX RDB database. Or in a Btrieve database. Or in an Access database or a spreadsheet.

But analysts and directors at the agency, a quasi-governmental organization in Boston that secures mortgages for low- to moderate-income borrowers, have easy access to a combined view of everything through DQpowersuite from Charlotte, N.C.-based Metagon Technologies LLC.

DQpowersuite provides a unified data view (also called a federated view) of all data sources and lets end users build reports and make queries as though the heterogeneous databases were one relational database system.

According to MHFA project manager Carl Richardson, the installation of DQpowersuite was a painless way to bridge the agency's data islands without having to retrain the 100 end users of Cognos Corp.'s Impromptu executive information system or conduct a massive effort to re-engineer the back-office systems. DQpowersuite "gives me a lot of flexibility," says Richardson. "I no longer have to worry about what database the data is contained in."

Juggling Databases

Organizations that are juggling a mixed set of databases as the MHFA is are ideal Metagon customers, says CEO Lance Becker. And there are plenty of them, he adds.

"The concept of a single database has been destroyed," he says. "[Companies] have got lots and lots of different data types, in lots and lots of differ-

ent data sets, in lots and lots of different computers."

Metagon originated within Decision Support Inc., a vendor of reporting software for Unisys Corp. computers. In January 1998, Decision Support spun off Metagon to focus on building reporting products for heterogeneous

computing environments.

The key technology behind Metagon's products — DQbroker, its query engine; DQview, which enables data access via an Excel plug-in; and DQpowersuite, a set of products that includes reporting, extraction-transformation loading, programming application programming interfaces and an Excel plug-in — is a metafile, says Becker. The metafile pulls all the metadata stored in the original databases, collecting



"THE CONCEPT OF A SINGLE DATABASE has been destroyed," says Metagon CEO Lance Becker

Metagon Technologies LLC

Location: 624 Matthews-Mint Hill Road, Suite 150, Charlotte, N.C. 28105

Telephone: (704) 847-2390

Web: www.metagon.com

Niche: Its products — DQbroker, DQpowersuite and DQview — enable unified data views for simultaneous, real-time access to multiple databases.

Why it's worth watching: Less query and reporting support are required; products can possibly eliminate the need for a data warehouse architecture.

Company officers:

- Herb Verbesey, founder
- Lance Becker, president and CEO
- David Griffin, chief technology officer

Milestones:

- 1995: First product introduced through Decision Support Inc.
- January 1998: Spun off from Decision Support
- November 1999: Latest product, DQview, released

Employees: 25; growing at 200% per year

Profitability date: 2000

Burn money: Private; investors undisclosed

Customers: Massachusetts Housing Finance Agency, Global Companies LLC, Vanderbilt & Associates

Partners: Allaire Corp., Sun Microsystems Inc., SilverStream Software, Dataflux Corp., Unicon Research Corp.

Red flags for IT:

- If you have a homogeneous set of databases, you won't get much benefit from these products.
- In general, query performance will be slower than if directly accessing a single database or a warehouse.
- Database vendors are adding online analytical processing and data-mining capabilities to their core database engines, encroaching on Metagon's niche.

information on where and how the corporate data is stored and enabling the query engine to break down the SQL request and send subrequests to the appropriate database engines. Processing stays at the source machine as much as possible to optimize performance. Result sets can come to a third location for further processing if needed, such as in the case of a join across database engines.

In Need of Native Support

Metagon has built native support for today's popular relational databases but has a less compelling story for corporations with legacy mainframe systems, where it uses third-party tools for access, says Becker.

Although Metagon supports DB/2 natively, it's weak on support for IBM mainframe databases, which Peter Urban, an analyst at AMR Research Inc. in Boston, says he regards as a negative. And customers will have to contend with the unavoidable performance hit that comes from using a federated data view, Urban says. Unlike a data-warehousing architecture or direct queries to a database, queries are slower to process, especially in the case of complex combinations of disparate databases.

Adding native support for more databases is part of Metagon's plans, Becker says, as is improving installation procedures and finding ways to incorporate desktop data, such as the information stored in personal databases, into the mix.

Metagon has already taken notice of the desktop and has introduced a new product, DQview, that allows users to embed SQL queries into Excel spreadsheets and have them executed against back-office databases through the DQbroker query engine. DQview is a compelling product, says Urban, because it puts SQL expertise in the hands of business analysts, in a spreadsheet format they're familiar with it. The end result is that the product eliminates the need for an information technology person to serve as the interface between the business users and the databases. ■

Johnson is a Computerworld contributor based in Seattle.

the buzz
STATE OF
THE MARKET

Not a New Idea

Metagon has several competitors, split among traditional enterprise-reporting vendors and newer companies that provide unified data-views software.

DataDirect

Merant International Ltd.
Morrisville, N.C.
www.merant.com

DataDirect is middleware that creates a single-sign-on, real-time, integrated view of almost any database management system. It supports stored, XML, Web and packaged-application data. Like Metagon, it works with third-party query and reporting tools.

E-Catalog System

Cohera Corp.
Hayward, Calif.
www.cohera.com

Cohera's software has the same key features as Metagon's, but Cohera's niche is so specific — business-to-business firms that want to build integrated electronic catalogs combining information from multiple vendors — that it crosses just a thin slice of Metagon's market.

Focus and WebFocus

Information Builders Inc.
New York
www.ibi.com

Information Builders is making a play for the heterogeneous, intranet-infrastructure market with its WebFocus tool, which translates results into HTML pages. Focus products rely on their own query tools; Metagon lets users work with third-party query and reporting tools.

Integrity

Vality Technology Inc.
Boston
www.vality.com

Integrity operates on free-form data and data stored in relational database applications. Vality differentiates Integrity by focusing on uncovering hidden relationships among data for business analysis, whereas Metagon emphasizes DQpowersuite's purer querying capabilities.

Rapid Diagnostic

InfoRay Inc.
Cambridge, Mass.
www.inforay.com

This suite of products offers the same kind of access-anywhere capabilities as Metagon's DQpowersuite. It has modules that handle access to data and apply a company's business rules to the requested data. — Amy Helen Johnson

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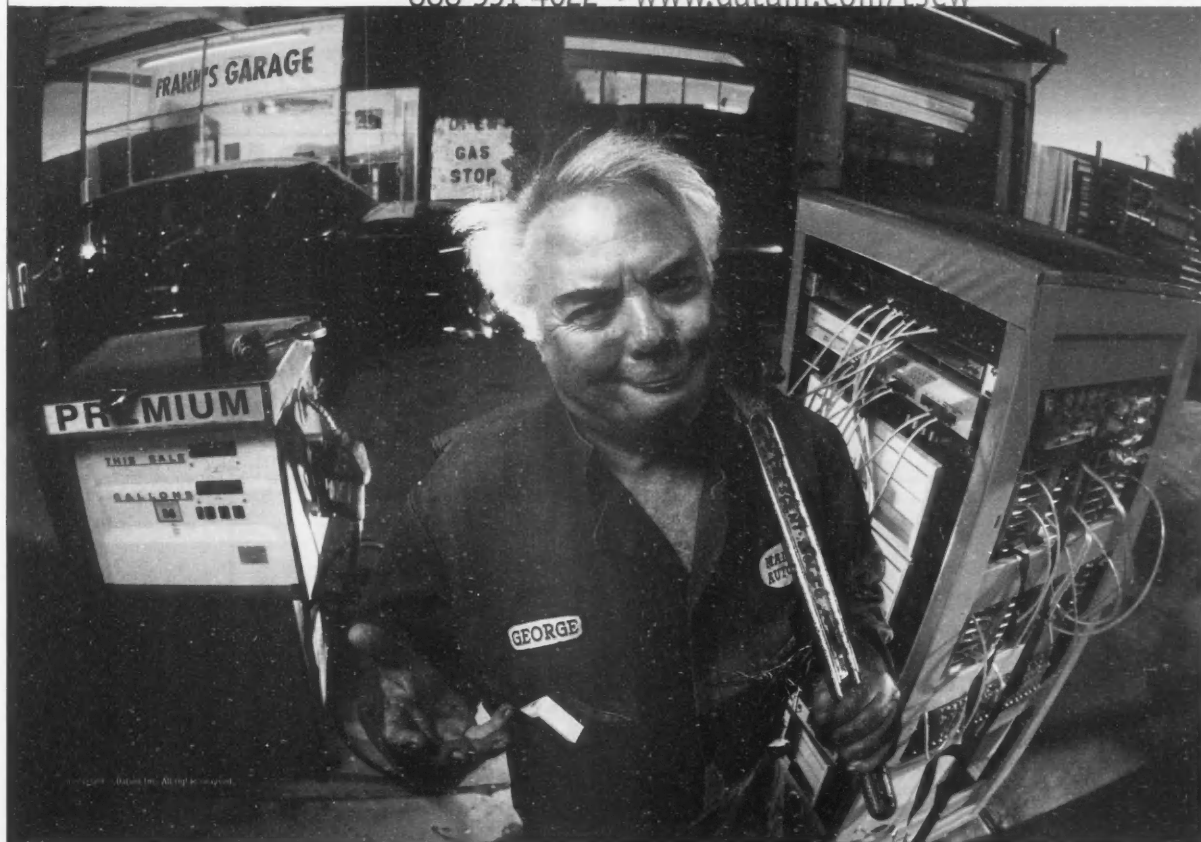
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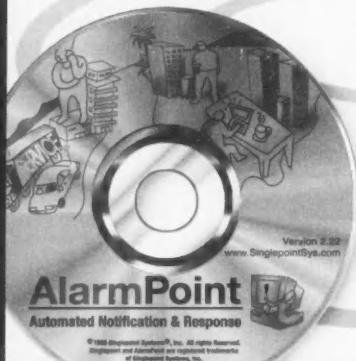
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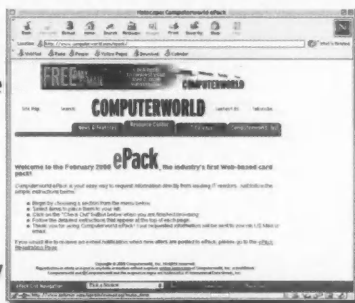
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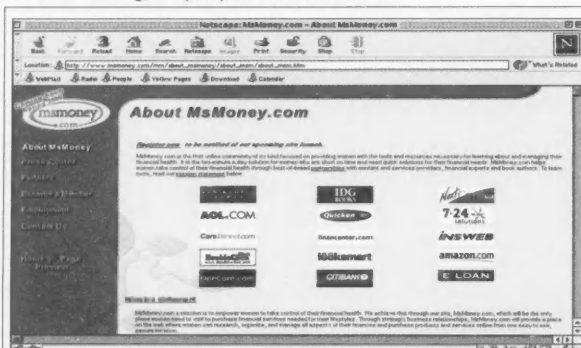


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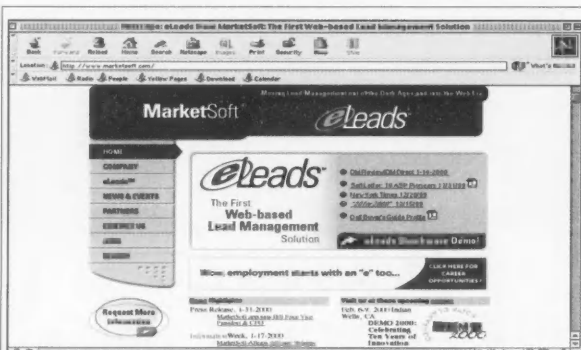
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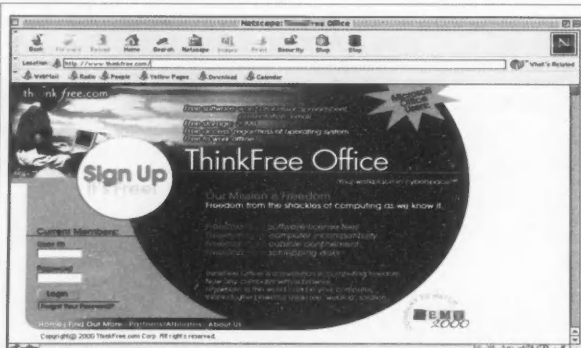
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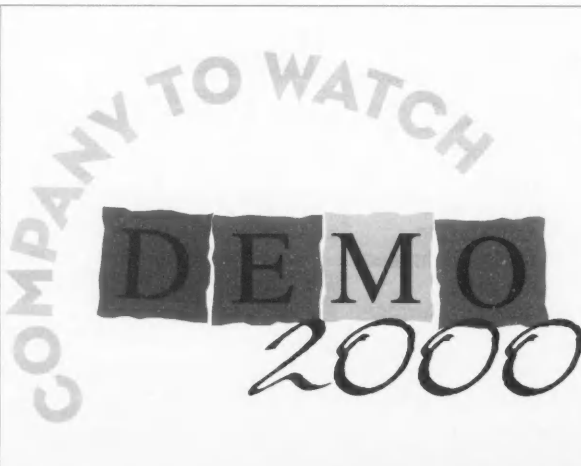
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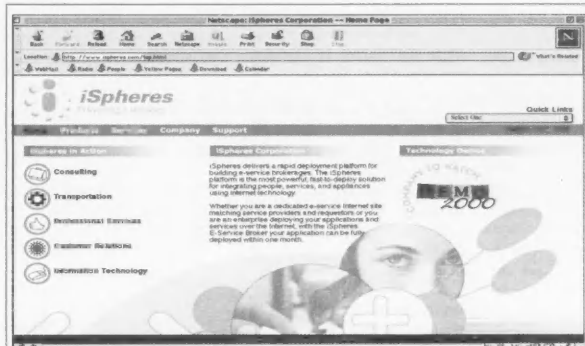
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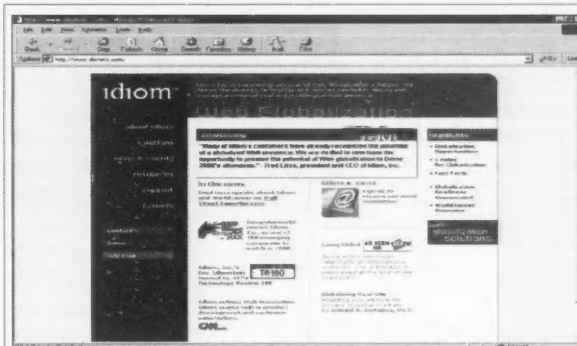
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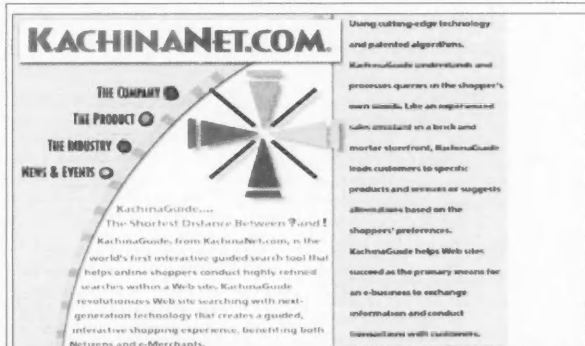
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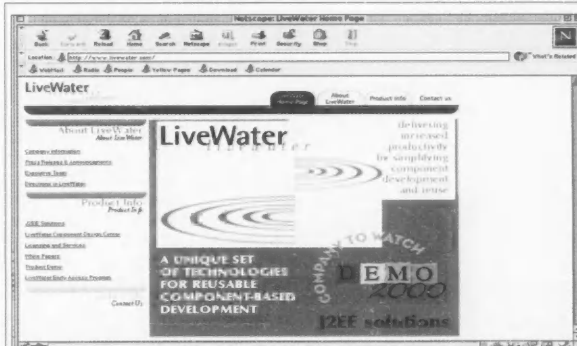
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Guardians of Your Web Security

WHO: Brian Koref

COMPANY: Conxion Corp., Santa Clara, Calif.

TITLE: Web security architect project leader

BACKGROUND: U.S. Air Force Office of Special Investigations, Unix systems administrator, computer crime investigator

MOST RECENT PREVIOUS JOB
TITLE: Senior systems analyst, security

REPORTS TO: Director, information security

SKILLS FOR JOB: Security tools experience; knowledge of security vulnerabilities in major operating systems, the Web and e-commerce applications; networking; some programming; people and business skills

A KEY TO SUCCESS: "The key to getting executive buy-in to security is to talk their talk. Show them how lack of security will hit productivity and profits."


"SOME CLIENTS HAVE EXPOSED THEMSELVES," says Brian Koref, Web security architect at Conxion Corp.

BY DEBORAH RADCLIFF

A NEW information technology job title has emerged that may sound like a combination of secret agent and master builder: Web security architect. But don't let the title fool you. Web security is in-the-trenches work, says Brian Koref, who's responsible for the security of more than 100 business Web site servers cohosted at his company, Conxion Corp. Here's a look at his work and its challenges and opportunities.

Elementary Web security: "Business ISPs are a prime target for hackers, because they're looking for rich server farms," Koref explains. "When CD Universe got hacked, no one realized that it was the company's ISP that got hacked. So straight off, you've got to look at how an ISP handles the security end of the business."

Getting started: Before working on a Web security project, Koref explores the architecture — everything from the type of operating systems to the software housed on the Web server.

If some of that software is homegrown, he examines the software code. This is an important first step to Web security, because Perl, common gateway interface scripts and Java applets created in-house are often written without security in mind. "You need to make sure these applications won't accept rogue Java applets or Perl scripts," he says.

Temperament: Attention to detail is only one part of the job. It also requires diplomacy. How do you tell corporate higher-ups that their security stinks? How do you get them to spend money on security? "I try to talk in their language," Koref explains. "For example, a firewall could be the single biggest point of failure in a company. If it breaks and it stops business, it could be very costly. And if customer information or credit cards get stolen, you're also talking reputation risk."

Tools of the trade: After reviewing a system, Web security architects secure the environment through a combination of means, including encryption, firewalls, intrusion detec-

tion tools, antivirus applications, public-key infrastructures and virtual private networks. They're also responsible for mapping the network, patching operating systems and removing vulnerable services — like anonymous file transfer protocol (FTP).

Challenges: Patience and flexibility are also important for anyone doing this work, staffing experts say. First, according to Ian Poynter, founder and president of security consulting firm Jerboa Inc. in Boston, it's hard to deal with imperfect technologies that don't interoperate easily. Second, building secure infrastructures over insecure operating systems, applications and services isn't easy. "Combined, it's very difficult to get your hands around all the little things," he says.

Complaints: Administrators tamping with secured servers can be an issue. "Once I've secured their systems, customers depart from the baseline security structure without telling me," Koref says. "Some clients have exposed themselves by reopening anonymous FTP into their servers [a favorite means of entry for hackers], or allowing read/write on their Web server hard drives — great for hackers to store their hacking tools or pornography onto the client's Web server."

Outlook for career: Koref says he feels pretty good about his future. With the shortage of information security professionals and the boom in e-commerce, Koref can count on work well into the future. But he says his ultimate plan is to manage people like himself. ■

Radcliff is a freelance writer in Santa Rosa, Calif.

MORE THIS ISSUE

For more on Koref and IP security, see page 38.

Just the Facts

Web security architect is a new position requiring a combination of Internet security and e-commerce implementation skills, according to Tracy Lenzner, founder of information security recruiting firm Lenzner and Associates in Las Vegas.

Salary: Because they're so scarce, Web security architects can earn anywhere from \$80,000 to \$120,000, depending on technical and industry experience, Lenzner says.

Driving forces: At this point, most Web security architects are heading to consulting and service firms like Internet service providers and application service providers, according to Ian Poynter, president of Jerboa. But that's changing, says Lenzner. Already, Web security architects are trickling into e-commerce start-ups. A year from now, brick-and-mortar companies will be looking for the same skills.

Specific skills:

- Unix, Windows NT and, increasingly, Linux administration
- TCP/IP
- Networking (Cisco certification is a plus)
- Firewall design/implementation
- Intrusion-detection and antivirus software implementation
- Public-key infrastructures, virtual private networks and other encryption experience. "It helps if you have some experience on how hackers hack," says Brian Koref, Web security architect at Conxion. "I got mine from being a federal agent for the Air Force [Office of Special Investigations]. I had to interview hackers and determine their methodologies."

Getting trained:

- The SANS Institute in Bethesda, Md., offers a series of educational conferences (www.sans.org)
- Two private courses to consider: New York-based Ernst & Young LLP's Extreme Internet Hacking course in Houston (www.ey.com) and New Technologies Inc.'s Internet investigations courses in Gresham, Ore. (www.forensics-intl.com).
- Certification for the Information Systems Security Professional is offered by the International Information Systems Security Certification Consortium Inc. in Shrewsbury, Mass. (www.isc2.org).
- And don't forget the biggest hacking conference in the country, Def Con, which is held each summer in Las Vegas (www.defcon.org).

— Deborah Radcliff

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The candidate we select will be responsible for sustaining and test engineering. As a part of sustaining engineering, you will take responsibility for second line technical support, bug fixes, and quarterly updates of the NetMaker XA products. Test engineering functions require design and implementation of automated and manual Unit and Integration Tests for NetMaker XA and MainStation products, with implementation in C++ and Perl.

We require a BS or MS in Computer Science or Computer Engineering, along with knowledge of IP and/or ATM Routing and Network Engineering. Course work in Network Engineering, co-op experience and/or work experience will be considered. Experience in formal software testing and test automation: C++, C#, JSP/Perl, UML, SR, SRT development experience are all essential.

Excellent compensation package including stock options is available to the selected candidate. Interested individuals are invited to forward/fax/e-mail (preferred) resume to: Ann Marie Gordon, Operations Manager, Make Systems Laboratories, 200 Regency Forest Drive, Suite 150, Cary, NC 27511-8502; voice: 919-461-2445, ext. 238; fax: 919-461-2447; e-mail: gordon@makesys.com
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make systems, Inc.

DIRECTOR OF INFORMATION SERVICES

Well respected educational organization seeks a candidate with a minimum of 5 years experience in application software design & programming, as well as background in network & hardware administration. Must have experience in managing and supervising an IS dept. Should have programming experience in MS Access & one of the following langs: Basic, Visual Basic, Paradox, dBase, or PowerBuilder. Experience working in an academic environment utilizing the DataTel software package. Should have working knowl of NT/Back Office, Win 95, firewalls, PC/Server configurations & diagnostic experience, with a full understanding of lan/wan security, NT domains, trusts, vpn & ras.

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email: KevinAdMan@aol.com

Technical Consultant

Wanted by ocean transportation company in Jacksonville, FL. Must have BSc/MS (CS) or equiv. and exp. in one or more of following: VC++, COM/DCOM, MFC, ASP, ATL, IIS, MTS, ADO, JAVA, HTML/DHTML, CORBA, EJB, NET/NT/NTS, ERP/SAP, NETWORKING, LOTUS NOTES ADMINISTRATORS, WEB TESTERS. Send resumes to: e.Solve technologies, 165 Washington Street, Quincy, MA 02169. OR jobs@esolve.com

Multiple openings for Programmer Analysts, Project Leaders and Sr Consultants. Must have BS/MS (CS) or equiv. and exp. in one or more of following: VC++, COM/DCOM, MFC, ASP, ATL, IIS, MTS, ADO, JAVA, HTML/DHTML, CORBA, EJB, NET/NT/NTS, ERP/SAP, NETWORKING, LOTUS NOTES ADMINISTRATORS, WEB TESTERS. Send resumes to: e.Solve technologies, 165 Washington Street, Quincy, MA 02169. OR jobs@esolve.com

Systems Analyst

Boston, MA; Analyze, design and implement Distributed Financial System using Object Oriented analysis, C++, Sybase, UNIX, Windows NT & PERL. Provide technical support. Req'd Masters in Engg. or Comp. Sci. or Math. 1 year exp in job offered. 40 hrs/wk, 9:00 a.m. - 6:00 p.m., \$100,000/yr. Submit two (2) copies of resume to response to: Case #19983293, P.O. Box 8968, Boston, MA 02114.

Systems Analyst

w/2 yrs exp analyzing user reqs, procedures & problems to automate processing or improve existing comp system in IBM mainframe/midrange envmt using RDBMS, SQL, COBOL & IBM RS/6000. Bach in comp sci or equiv or related field. Edu may be domestic or foreign & may be edu. equivalency. Send resume to Pyramid Consulting Inc., 5335 Triangle Pkwy, Ste 510, Norcross, GA 30092. Sal \$50K/yr.

Programmer Analyst

w/2 yrs exp in analysis, design, development & implementation of software, systems and applications using COBOL, C++, JAVA and Oracle 7.x. Salary \$60,000. Multiple Position openings. Send resume to: DataSoft Technologies, Inc. 3473 Satellite Blvd., Ste 111, Duluth, GA 30096.

SOFTWARE ENGINEER:

Design and development of Business/Commercial application systems in a Windows 95/NT environment. Demonstrated ability in PowerBuilder 5.0. Demonstrated ability in SQL Server 6.5. Demonstrated ability in Visual C++. Requires: B.S. in Maths, Computer Sci. Engg or related field plus 2 years experience in job offered or software development; 40 hrs/wk, 8:00 a.m. to 5:00 p.m.; \$60,000/yr. Send two (2) copies of resume/respond to: Case #19983155, PO Box 8968, Boston, MA 02114.

Software Developer

needed to design, dev, analyze & test computer programs using PowerBuilder, Oracle, MS SQL, Sybase & Forte. Apply to: HR, EXE Technologies, 300 Baldwin Tower Blvd, Eddystone, PA 19022.

Software Engineers

(multiple positions) sought by Software Development Co for Maritime Shipping Industry for job openings in Somerville, NJ. Must have Masters in Engg, Comp Sci, Applied Physics, Math or MIS. Respond to: HR Dept, Interlink Transport Technologies, Inc., 722 Courtyard Dr, Somerville, NJ 08876.

Senior Technical Consultant

sought by Software Services & Development Firm in Upper Saddle River, NJ. Must have BS in Comp Sci & 2 yrs comp exp. Must have 2 years programming exp on UNIX (AIX) platform developing in IBM's DirectTalk environment. Respond to: Ms. I. Papp, 600 East Crescent Ave, Upper Saddle River, NJ 07458.

Programmer Analyst

w/2 yrs exp in analysis, design, development & implementation of applications in IBM mainframe envmt using CICS, JCL and COBOL. Bach in comp. sci or equiv. Salary: \$60,000. Multiple Position openings. Send resume to: DataSoft Technologies, Inc. 3473 Satellite Blvd, Ste 111, Duluth, GA 30096.

Programmer Analyst

Malden, MA; Analyze, design and develop a Value Based Management System using object-oriented, client-server technologies using Oracle, PL/SQL, SQL/PLUS and PFC: PowerBuilder as a front-end tool. Prepare test plans, unit testing & system maintenance guide. Req'd. 2 yrs exp in job offered. 40 hrs/wk., 9a-6p., Mon-Fri., \$60,000/Per Year. Applicants should submit two (2) copies of resume in response to Case #19983377, P.O. Box 8968, Boston, MA 02114.

Programmer Analyst

Malden, MA; Analyze, design and develop Business Application System based on Structured Analysis, Design Methodology and EPO data modeling techniques on Windows NT servers. Design and implement HP3000 applications systems using MPE, PowerHouse, Cobol Transact, Reg'd. Bachelors in Comp. Wr. Systor. Engg. or Math. 2 yrs exp in job offered or 2 yrs exp. as IT Solutions Specialist. 40 hrs/wk., 9a-6p., Mon-Fri., \$26.39 Per Hour. Applicants should submit two (2) copies of resume in response to Case #19983092, P.O. Box 8968, Boston, MA 02114.

Programmer: to design, implement, edit & maintain C/C++ and Progress user application program in the Unix environment. Req. MS or equivalent in CS or MIS; Proficiency in Visual Basic, Windows NT and Unix; \$68,500.00/yr., 40hr/wk, 8:00 a.m.-5:00 p.m. Contact Information Systems Manager of Sivaco Georgia, 24 Herring Road, Newnan, GA 30265, or a frederick@sivaco.com

Director of Software Operations (VP) sought by firm that provides integrated IT infrastructure solutions. Must have Master's or equiv. in Business Admin., Finance, or rel. field, plus experience managing software development operations. Resumes to: HR, InteQ Corp., One Van de Graaff Drive, Burlington, MA 01803.

Computers: Software Engineer sought by Researcher & Dvpr in Comp Sci. for job opening in Princeton, NJ. Must have Bach in Comp Sci or Math and 1 yr exp researching, design & develop comp s/ware systems in conjunction with h/ware product devt for medical, industrial, military, communications, aerospace & scientific applcs. Respond to: MECA HR, (SE), Panapaz 3C-6, 1 Panosonic Way, Secaucus, NJ 07094; (2 positions available).

Database Administrator wanted by New Jersey based IS/IT Consulting Services Firm for job openings throughout US. Must have 5 yrs s/ware exp. Respond to: HR Dept, Avenir, Inc., 16 Pearl St, Ste #205, Meluchen, NJ 08840

Full time Senior Programmer Analyst to develop, modify and maintain applications that are customized or standardized using ER Diagram, PL/SQL, Oracle Developer 2000, Forms 4.5, Reports 2.5, Oracle 7 database. Must have a Bachelor's degree in Computer Science or foreign degree equivalent. Must have two years of experience in the job offered or two years of experience in a position with same duties. Salary \$73,000/yr. Send resume to: DataScan Technologies 1105 Sanctuary Parkway, Suite 190, Alpharetta, GA 30004 Attn: Karen Hutton

S/ware Design Co, Peekskill, NY Seeks Programmer/Analyst using object oriented methodology to design & develop analytical s/ware for CMOs, MIS, ABS users; implant & test new system; design & design internal database. Win applcs portable to UNIX; maintain s/ware for internal database & design internal database. Win products like CMO strategy modules using C/C++, Win 95/NT, COBOL, SQL, Req BS (or equiv) in CS or rel field. 2 yrs exp in multi vendor applc devt envmt, Demco knowledge & exp CMO, MIS, ABS. Reply to Prometheus Software Consulting, Peekskill, NY Fax: (914) 734-2272, pbu@dwse.com

Systems Analyst sought by Textile Mfr/Marketer in Winston-Salem, NC. Must have Bach or equiv in Sci & 2 yrs s/ware exp. Respond to: HR Dept, Mr Manager, Sara Lee Shared Services, 531 Northridge Park Drive, Rural Hall, NC 27045.

Database Administrator sought by Firm involved in Technical Solutions for business in Norwood, MA. Must have 1 yr database exp. Respond to: HR Dept, ADZAP, Inc., 210 Neponset St, Norwood, MA 02062.

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Database Administrator III Dallas, TX

The selected individual will be responsible for the production support of Sybase hosted applications, as well as design and implementation of new web-based Sybase and Oracle applications. Requirements include 3-5 years as an Oracle DBA on Oracle 7.x or greater, running on UNIX platform. Must have HP and Sun Solaris experience. A background in Sybase, DB2, data warehousing, reporting tools and ER modeling is a plus. Please forward your resume, salary requirements and Job Code: CW99-0017606 to: Bank of America, NC1-021-01-15, 401 N. Tryon St., Charlotte, NC 28255; fax (800) 621-6177. Visit us at www.bankofamerica.com. Bank of America is an Equal Opportunity Employer, M/F/D/V.

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Software Consultant, Business wanted by Information Systems Consultation Firm in Houston, TX. Must have MS in Comp Sci or MIS & 6 mos exp in C/S, OO & rdms. Respond to: Mr. Keith Clananhan, Managing Partner, 3000 Wilcrest, Ste 164, Houston, TX 77042.

Software Engineer/Programmer

wanted by Pennsylvania based Firm involved in Engineering Products & Services for Energy for job located in Houston, TX. Must have MS in Comp Sci or in any field of engg & 1 yr exp in C++, COM/DCOM & CORBA. Respond to: Wendy Farren, HR Rep, Stoner Associates Inc., 1170 Harrisburg Pike, Carlisle, PA 17013-0086.



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Responsible for administration of the Internet hosting division, including technical oversight and coordination of ongoing investment capital; evaluate, procure and install computer equipment for hosting facilities; conduct management studies; collect and interpret business, technical, and statistical data to prepare budget estimates; forecast future needs; supervise Internet Hosting Technician and Hosting Development Manager. Must have BS in Business Management or related, and two years' experience in job. Experience must include wide-area networking, including knowledge of equipment setup and technical support, as well as project and investment development. \$26,000/year, 40 hrs/wk. Must have proof of legal ability to work in the United States. Send your resume to the Iowa Workforce Center, 51 W. Washington, Fairfield, Iowa 52556-3327. Please refer to Job Order IA101024. Employer paid advertisement.

Computer Info Systems DIRECTOR, DATA SECURITY

Seeking individual to manage security, integrity & availability of all information systems (IS) used corporate-wide. Duties include: developing/publishing standards, policies & procedures for secure use of IS; developing Corporate Information Protection Plan (IPP); analyzing security requirements of business units; assisting with Mgr. in developing business unit IPPs; evaluating, testing & recommending security products & procedures for business units; evaluating & installing security software for tracking & reporting; evaluating business unit security compliance; creating & maintaining standards, policy & procedures to facilitate E-commerce functions; monitoring security of all IS for intrusion, detection, isolation & correction; developing & implementing incident response team; procedures for all business units; managing liaison with IS security organizations, ensuring the security of corporate wide area network (WAN), local area networks (LAN) & IS infrastructure; evaluating & testing products & services for security enhancement; conducting pilot programs & evaluating vendor provided software & hardware; making recommendations to corporate management regarding long-term security plan & emerging technologies. Requires B.S. degree in Business Administration or Computer Science & 1 yr. exp. in the job offered or as an IS Auditor/Audit team leader. Must be a certified Information Systems Auditor. Forward resume and salary history to: Dept-C@unitria.com or by fax to 630-368-8226. EOE M/F/D/V

Software Engineer

Create and maintain a Global Component Information System to gain organizational control over inventory/components to prepare bills of materials and display the total cost for a particular order; formulate algorithms for inventory control plan production. Must have Bachelor's in Computer Science, Engineering, or related, and one year experience in job or as Programmer. Must have knowledge of applied mathematics, statistics, Basic, Fortran, C++, and Visual Basic. Send resume to: Donastone Corp., ATTN: Laurie Sluser, 504 North 4th St., #110, Fairfield, Iowa 52556



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Developer of company-wide contact and workflow solutions has openings for the following positions at its offices in Cambridge, MA, San Francisco, CA and New York, NY:

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Provide software solutions to multinational clients and code complex customer service workflow solutions using Pegasystems' developer toolkit, HTML and JavaScript, in the following multi-platform environments: UNIX, NT and MVS. Job Code: PEGABSA. Senior-level positions also require project leadership responsibilities. Job Code: PEGABSASR.

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Analyze, design and implement business applications using Visual C++, Visual Basic, Visual J++, HTML, VB Script, JavaScript, XML, and Booch-Method. Job Code: PEGASE.

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Define and create software architecture methodologies and tools for managing configuration across multiple implementations. Lead and manage the deployment of complex workflow solutions to multinational clients using Pegasystems' developer toolkit, SQL, HTML and JavaScript in multi-platform environments: UNIX, NT and MVS. Job Code: PEGASACSR.

Please send resumes to: Sandy Barker, Pegasystems, 101 Main St., Cambridge, MA 02142 or fax (617)374-9620. Please specify Job Code: EOE.

Senior Development Manager

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SOFTWARE ENGINEER

Software engineer to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in PowerBuilder, Sybase, Erwin and PFC. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of PowerBuilder, Sybase, Erwin and PFC. Salary: \$66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Mr. Terry Kinkaid, Armstrong County, Job Center, 1270 N. Water Street, PO Box 759, Kittingham, PA 16201. Job No. 9105759.

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Travel may be required. Salary DOE. Send ad & resume to: Adm. 31261-7, Attn: Patty McNally, 2100 East Grand Avenue, El Segundo, CA 90245. Please indicate specific title/location of job for which you are applying on your application letter.

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Sr. Technical Consultant
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Sr. Technical Consultant
(Oracle Applications Developer)

Travel may be required. Salary DOE. Send ad & resume to: Adm. 31261-7, Attn: Patty McNally, 2100 East Grand Avenue, El Segundo, CA 90245. Please indicate specific title/location of job for which you are applying on your application letter.

Senior Software Engineer

To design, develop and maintain application software for various insurance applications using PowerBuilder, Sybase, C, Visual C++, Perl, Case Tools, Visual Basic, Unix Shell and Oracle on UNIX/LAN platforms. Require: M.S. degree (or equivalent in Computer Science or an Engineering Discipline, with a demonstrated ability to perform stated duties gained through prior work experience/academic coursework. A B.S. degree with five years of progressively responsible experience will be considered equivalent to the M.S. degree. Extensive travel on assignments to various client sites within the U.S. is required. Salary: \$70,000 per year, 8:00 am to 5:00pm. M-F. Apply by resume to: Raghavendra Kulkarni, President, Pro Softnet Corporation, 3235 Satellite Blvd. Bldg. 400, Suite 300, Duluth, GA 30096; Attn: Job BR

Senior Software Engineer

Design, develop and implement computer software systems to determine feasibility of design and directs software testing procedures, programming and documentation. Work involves extensive travel and frequent relocation. Must have one year of experience using: 1 of Group A and 1 of Group B and 1 of Group C; OR 2 of A and 1 of B; OR 2 of A and 1 of C as follows: Group A - DB2, IBM390, IBM ES9000, MVS, IMS, IDS, Group B - CL/400, CCS, TSO, VSAM; Group C - TELON, COBOL, JCL, AS/400, RPG/400, COBOL/400. Masters' degree in one of several limited fields: Computer Sci/Apps, Eng., Chem., Math or Physics. Will accept Bachelors with 5 years of progressive experience as a computer professional. Salary is \$70,000 per yr. 40 hrs/wk. 9:00-5:00 p.m. Please submit resumes to: Mr. Clem Pizzuti, Manager, Unicom/Un Job Center, 32 Iowa Street, Uniontown, PA 15401. Reference Job Order No.: 9105759

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Senior Software Engineer

(multiple openings): Design, develop and implement software systems to determine feasibility of design and directs software testing procedures, programming and documentation using relational data base management systems (RDBMS). Work involves extensive travel and frequent relocation. Must have 1 year of experience using 1 from Group A and 2 from Group B OR 1 from A and 1 from C OR 1 from A and 2 from C. AI DB2, FoxPro, Informix, Ingres, MS-Access, Oracle, Paradox, Sybase and Unity. BI: AIX, DOS, HP-UX, MVS, Novell, OS/2, Sun OS, UNIX, VAX/VMS, Windows, C, 4GL, APT, C, C++, COBOL, Case Tools, C Shell, Crystal Reports, E-SQL, Easytrieve, JAVA, ODBC, PowerBuilder, PowerDesigner, Power J, Power++, S-Designer, SQL, Shell Script, Visual Basic. Masters' degree in one of several limited fields: Computer Sci/Apps, Eng., Chem., Math, Physics or a scientific or business related field. Will accept Bachelor's degree or foreign equivalent plus five years of progressive experience as computer professional. Salary is \$70,000 per yr. 40 hrs/wk. 9:00-5:00 p.m. Please submit resumes to: Ms. Barbara Cole, Supervisor, Greene County Team PA Career Link, 4 West High Street, Waynesburg, PA 15370. Job Order No.: 9059625.

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needed for systems level programming, analysis and integration support for PeopleSoft interfaces on UNIX, NT and Mainframe platforms using mainframe assembly, COBOL and Oracle. Bachelor's required in Math, Computers, Engineering or any other related field of study, plus one year of experience. Must have proof of legal authority to work in the U.S. Salary: \$58,000/year for a 40 hour work week. Interested applicants submit resume or C.V. to the Phila Job Bank, 444 N. 3rd St. - 3rd Fl., Philadelphia, PA 19123. Refer to Job Order #9105710. Ad paid by An Equal Opportunity Employer.

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needed for analysis, design, development and implementation of Oracle applications on UNIX and Windows NT platforms; to install and migrate new Oracle versions and maintain version control and act as Oracle Applications DBA. Masters' required in Math, Computers, Engineering or any other related field of study, plus two years of experience. Must have proof of legal authority to work in the U.S. Salary: \$80,000/year for a 40 hour work week. Interested applicants submit resume or C.V. to The Phila. Job Bank, 444 N. 3rd St. - 3rd Fl., Philadelphia, PA 19123. Refer to Job Order #6029619. Ad paid by An Equal Opportunity Employer.

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RDDBMS: DB2, Informix, Oracle, FoxPro, MVS, Novell, UNIX, VAX/VMS, Windows, APT, Crystal Reports, C, C++, COBOL.

Oracle RDDBMS: Designer 2000, Developer 2000, Oracle RDDBMS, Oracle Applications, SQL*Plus, Pro*C, PL/SQL, SQL*Forms, SQL*Reports.

GUI and Internet Applications: Windows 95, Windows NT, Visual C, Visual C++, C, C++, Visual Basic, PowerBuilder, TCP/IP, HTML, MFC, CGI, MTS.

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GUI and Internet Applications: Windows 95, Windows NT, Visual C, Visual C++, C, C++, Visual Basic, PowerBuilder, TCP/IP, HTML, MFC, CGI, MTS.

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Senior Software Engineer Positions to design, develop and implement software systems to determine feasibility of design and directs software testing procedures, programming and documentation. Work involves extensive travel and frequent relocation. Must have one year of experience in job offered or as a computer professional as well as 1 year of skills in field. Master's degree in one of several limited fields: Computer Sci/Apps, Eng., Chem., Math or Physics or scientific or business related field. Will accept Bachelors degree with five years of progressive experience as computer professional. Salary: \$80,000 per/yr, 40 hrs/wk, 9:00-5:00 p.m. Please submit resumes to: Jennifer Cowan, Rapidigm, 4400 Campbells Run Road, Pittsburgh, PA 15205.

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Systems Integration Sr. Consultant. Job location: Conshohocken, PA. Duties: Design, develop, customize & implement different system modules of Help Desk using Remedy, UNIX & Oracle. Analyze & develop system specs. & develop design specs. & complex source codes using Shell Scripting. Perform system and integration testing. Analyze & assess clients' system needs & recommend e-commerce version of current system. Train end-users on new system. Perform maint. & troubleshooting of system. Requires: M.S. (or foreign equiv.) in Comp. or Info. Sci., Eng. or related field and 1 yr. exp. in the job offered or 1 yr. exp. as a Programmer/Analyst, Software Eng. or Consultant. Exp., which may have been obtained concurrently, must incl.: 1 yr. exp. designing & developing system modules using Remedy and 1 yr. exp. analyzing & assessing system needs & making recommendations. EOE 40 hrs/wk., 8:00 a.m. to 5:00 p.m. Salary: \$80,000/yr. Send resume (no calls) to: Diane Tuccio, AnswerThink Consulting Group, 3200 Windy Hill Rd., Suite 850 West, Atlanta, GA 30339. Must have legal auth. to work in U.S.

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Cisco Earnings Beat Analysts' Predictions

Revenue up 53% for the quarter despite Y2k fears

BY JAMES COPE

EVEN BEFORE Cisco Systems Inc. (Nasdaq:CSCO) reported second-quarter earnings last week, investors were driving up its stock price, betting the company's earnings would beat analysts' projections. And Cisco didn't disappoint.

For its second quarter of fiscal 2000 ended Jan. 29, the internetworking giant announced net income of \$825 million — almost triple the \$282 million it netted in the same period a year ago — on total sales that were up 53% to \$4.35 billion.

The company also declared a two-for-one split on its common stock for shareholders of record as of Feb. 22.

Cisco President and CEO John

Chambers says he expects Cisco's gross margins to decline and its expenses to grow slightly faster in coming quarters.

Despite that caveat, analysts like Tim Luke at Lehman Brothers Inc. in New York say they expect to see strong growth for Cisco. Luke says Lehman Brothers has moved its fiscal 2000 earnings estimate for Cisco from 99 cents per share to \$1.03 and from \$1.25 to \$2.32 for fiscal 2001.

"Revenue growth of 53% is amazing, and that's with Y2k fears in there," says Peter Andrew, an analyst at A.G. Edwards & Sons Inc. in San Francisco. Andrew says Cisco's biggest challenge

is to continue its effective integration of companies it buys, especially in light of Chambers' announcement that the firm planned to make another 20 to 25 acquisitions this year. "They're acquiring a number of companies, and moving at Internet speed," Andrew says. "If you hit a bump, it will hurt."

Luke says he found it interesting that the Asia/Pacific and European markets were particularly strong for Cisco, that its telephone company business was up 80% and that it remained strong in the enterprise sector. "Whereas Nortel [NYSE:NT] and Lucent [NYSE:LU] say they see difficulties in the enterprise, Cisco seems to steam on," Luke says.

But analyst Stan Schatt at Giga Information Group Inc. in Cambridge, Mass., says Cisco has a ways to go to catch up with Nortel Networks Corp. in optical networking. Schatt says Cisco's voice over IP systems lack important features. He also says Cisco should heed a "distant warning bell on routing," an area where Nortel may become a threat. "Cisco has 80% of [the IP router market], and it's a cash cow," says Schatt. ■

INDUSTRY ALMANAC

Cisco Earnings Soar

A year-to-year comparison of Cisco's second-quarter financial performance:

1999 2000	1999 2000
NET SALES	NET INCOME
\$4.35B	\$825M
\$2.85B	\$282M

52-WEEK NAME FEB. 11 2PM WK HIG WK LOW WK PCT CHG

52-WEEK NAME	FEB. 11 2PM	WK HIG	WK LOW	WK PCT CHG
SOFTWARE UP 6.7%				
ASWV 105.00 11.00 Arctic Software (L)	80.00	150.00	1.9	
ADBE 119.25 18.84 Adobe Systems (H)	86.00	146.83	18.8	
ARBA 211.63 30.50 Aruba Inc.	211.63	19.75	10.3	
APZN 55.37 8.12 Aspen Technology Inc. (H)	50.00	2.00	4.2	
ASCA 44.37 10.00 Autodesk Inc. (H)	37.88	5.38	16.5	
AVDZ 34.25 9.43 Avid Technology	14.00	156	1.2	
BMCIL 88.42 30.00 BMC Software Inc.	42.88	0.25	0.6	
RTSL 129.56 8.18 Business Objects S.A. (H)	126.50	24.50	24.0	
CIN 32.31 9.18 Cadence Design Systems (H)	21.56	1.96	4.7	
CBIST 45.37 8.56 CBT Group Inc.	42.88	3.94	9.8	
CHMP 180.00 11.00 Checkpoint Software Tech. (H)	171.75	24.75	16.8	
CTSK 183.00 25.00 Citrix Systems Inc. (H)	181.13	23.06	14.6	
CDSW 74.25 19.37 Cogent Inc. (H)	68.06	3.68	5.1	
CA 194.00 30.12 Computer Associates Int'l Inc.	68.81	1.13	1.6	
CPWR 40.00 16.37 CompuLink Corp.	20.75	1.69	7.5	
DCIM 71.31 3.37 Documentum	68.06	0.31	0.5	
FTV 64.87 32.00 Electronics For Imaging	48.38	1.50	3.5	
MNCS 132.00 13.75 Hqs Software	94.63	0.31	0.3	
HYSL 43.08 8.87 Hyperion Software (H)	48.13	3.56	8.0	
ISCS 49.12 12.43 iSCS Systems	31.68	6.69	14.4	
INFIA 135.00 18.00 Informatica Corp. (H)	120.06	10.75	20.8	
INFV 35.00 4.03 Inform Software Inc. (H)	15.19	0.19	1.3	
FTSI 80.00 22.50 Interphase Corp.	61.56	9.00	12.8	
JOHY 61.12 29.43 Jack Henry Associates (H)	60.94	4.41	7.6	
EDS 43.00 10.87 J.D. Edwards & Co.	38.25	0.75	2.2	
USIS 19.08 10.00 Knowledge Systems Inc.	24.38	6.84	24.3	
MACR 100.00 10.75 Macromedia Inc.	70.84	0.31	0.2	
MANI 38.12 5.25 Manugistics Group Inc. (H)	50.75	2.18	4.1	
MGSI 18.00 1.75 Matrix Graphics	13.88	13.13	0.3	
MUFI 189.93 11.89 Microsoft Corp. (L)	131.25	5.00	3.8	
NALX 33.56 10.08 NetScout Associates (H)	31.63	5.18	20.3	
NETI 167.00 24.75 Network General	154.38	7.13	6.4	
NOVI 42.43 18.06 Novell Inc.	38.89	2.06	5.5	
OSCI 82.88 30.00 Oracle Corp.	82.88	3.00	3.6	
PEPS 16.93 1.68 Perseus Technology Corp.	22.50	0.31	0.3	
PSFT 27.75 15.50 PeopleSoft Inc.	24.63	0.00	0.0	
PRIS 32.62 33.00 Price	38.75	0.81	2.2	
RATL 68.75 11.87 Rational Software Corp. (H)	68.75	13.25	23.6	
RHAT 101.31 7.00 Red Hat Inc. (L)	83.14	10.75	11.4	
QSTQ 120.00 14.00 Quest Software (L)	83.50	0.88	1.1	
SAF 24.87 21.75 Safar Inc. (H)	19.13	0.13	0.5	
SCUR 24.00 3.25 Secure Computing Corp. (H)	14.63	2.44	20.5	
SLC 44.93 17.63 Sterling Commerce Inc.	35.63	3.88	10.7	
SWW 55.25 18.12 Sterling Software Inc. (H)	32.25	3.84	20.2	
SGRC 23.43 8.81 Structural Dynamics Research	13.06	1.44	12.4	
SYSL 25.00 5.31 Sybase Inc.	23.84	0.06	0.3	
SYMS 18.12 3.50 Symantec Corp. (H)	18.84	1.34	7.3	
SMPX 15.62 12.12 Sunbeam	52.08	5.00	11.8	
SCIS 12.75 7.81 Systems & Computer Tech. (H)	22.81	4.58	25.2	
SAFV 71.91 8.43 TAF Inc. (H)	72.50	1.13	1.5	
TEBA 252.00 15.00 Tibco Software Inc. (H)	212.00	36.50	22.2	
TRIA 48.25 20.25 Triad Sys. Arch. (H)	24.38	2.00	8.9	
WVSI 16.00 29.33 Visteon Software Corp. (H)	16.38	17.82	11.2	
WIND 45.00 13.25 Wind River Systems Inc.	41.50	6.53	15.7	

52-WEEK NAME	FEB. 11 2PM	WK HIG	WK LOW	WK PCT CHG
SEMICONDUCTORS, CHIPS & EQUIPMENT UP 3.0%				
ADPT 63.56 19.00 Adaptec	47.50	7.38	12.4	
AMD 45.12 11.56 Advanced Micro Devices	42.94	3.56	8.0	
ALT 78.06 23.93 Altera (H)	73.34	2.59	3.6	
ADI 120.37 24.37 Analog Devices (H)	118.50	9.25	8.5	
AMAT 174.75 48.43 Applied Materials (H)	167.84	18.88	12.7	
AMEL 144.43 36.37 AMEL Technology Holdings (H)	132.75	0.75	0.5	
FCS 39.50 18.50 Fairchild Semiconductor (H)	38.89	0.08	0.2	
HWS 40.62 19.50 Harris Corp. (L)	31.13	0.67	2.0	
INTC 110.06 50.12 Intel Corp. (H)	108.13	1.93	1.8	
PLAC 71.68 25.18 LSI Instruments (H)	70.44	3.63	5.4	
LTC 110.93 41.76 Linear Technology (H)	108.88	5.58	5.3	
LSI 119.93 27.75 LSI Logic (H)	116.88	1.88	1.7	
MAXM 60.93 19.93 Maxim Integrated Products (H)	59.38	5.51	9.8	
MIL 85.00 34.25 Micron Technology	73.50	4.96	6.8	
MOT 50.37 63.37 Motorola Inc. (H)	152.89	6.06	0.6	
NSM 68.62 8.87 National Semiconductor (H)	64.68	0.25	0.4	
STM 221.62 40.25 STS/Thomson Microelectronics (H)	209.19	21.11	11.1	
SIF 88.00 37.38 Selenia Corp. (H)	71.81	0.75	1.0	
TAN 74.56 21.84 TanyaCorp. (H)	71.25	2.34	3.3	
TIN 140.00 43.00 Texas Instruments (H)	140.25	7.56	5.7	
UTSL 248.00 18.65 Uniphase (H)	233.75	14.25	1.5	
VTS 72.25 20.37 Vitesse Semiconductor Corp. (H)	66.63	21.01	46.4	
XYL 51.56 16.43 Xilinx (H)	58.00	0.44	0.7	

52-WEEK NAME	FEB. 11 2PM	WK HIG	WK LOW	WK PCT CHG
COMPUTER SYSTEMS UP 4.7%				
ACPL 121.00 32.00 Apple Computer Inc.	111.63	3.39	3.1	
ASIX 19.25 3.87 Asustek Systems	8.84	0.08	0.8	
BDOS 39.56 3.28 Bds Inc.	25.25	5.36	26.1	
CPS 47.93 18.75 Compaq	37.88	0.75	1.8	
DELL 55.00 33.37 Dell Computer Corp. (H)	51.38	5.75	11.6	
ITW 144.00 28.37 Datacube 2500 Inc.	37.88	0.75	2.8	
HP 129.00 63.37 Hewlett-Packard Co. (H)	122.25	6.75	5.7	
INT 144.00 59.83 Intuit Inc.	146.75	3.75	2.2	
IRM 118.18 86.87 IBM	118.18	6.87	5.5	
MAI 84.50 9.00 Macro Inc.	84.50	1.88	2.2	
MOT 181.37 17.00 Motorola Inc. (H)	153.89	2.88	4.8	
NATI 42.93 17.00 National Instruments Corp. (H)	38.75	1.75	4.2	
OCR 54.06 26.68 NEC	41.68	1.48	3.6	
NIPNT 125.00 43.62 NEC	113.50	4.50	8.7	
PHCM 36.25 3.43 Phoenix Tech. Inc.	30.00	4.94	6.1	
SI 20.43 8.87 Sony Electronics Inc.	9.15	0.68	0.8	
SON 295.87 71.68 Sony	283.38	4.56	1.7	
SWW 95.65 23.12 Sun Microsystems Inc.	94.84	10.44	12.8	
TCO 12.06 1.52 Teac Systems Inc.	10.56	2.88	28.0	
UNAT 48.68 20.93 Unisys	30.75	2.06	6.3	

52-WEEK NAME	FEB. 11 2PM	WK HIG	WK LOW	WK PCT CHG
INTERNET UP 0.6%				
AMZN 111.00 41.00 Amazon.com	77.56	3.76	3.9	
AVL 99.87 26.50 America Online	91.44	5.84	1.6	
ATHM 49.00 33.12 America Online	34.88	2.56	8.8	
CEFF 107.50 23.12 eMachines	71.68	0.66	1.0	
CRCK 24.00 5.48 Cybercash Inc.	8.75	0.75	8.7	
EBAY 234.00 64.00 eBay Inc.	199.13	9.50	5.4	
ETYS 165.00 13.75 eToys Inc.	165.00	22.25	12.3	
EMF 72.25 11.52 eMachines Inc. (L)	72.25	1.52	2.1	
GO 62.00 26.56 Lycos Inc.	51.13	2.69	5.6	
OMAT 102.00 18.00 Open Market Inc.	102.00	6.88	1.2	
OTEX 42.50 8.50 Open Text Corp. (H)	42.50	2.88	7.4	
PCNL 165.00 16.00 Proxad.com Inc. (H)	55.25	5.88	10.6	
PROF 50.62 14.00 Proxad Communications	50.62	4.75	23.2	
PSNL 101.18 30.37 Proxad Inc.	99.66	1.52	1.5	
RSAT 80.00 14.25 Security Dynamics	66.75	5.88	14.7	
SPYV 56.87 8.62 Spyglass Inc.	41.13	3.00	7.8	
SWW 84.75 5.00 World Communications Inc. (L)	68.75	18.25	26.1	
WOD 500.12 110.00 Verio Inc.	356.56	9.73	2.5	

52-WEEK NAME	FEB. 11 2PM	WK HIG	WK LOW	WK PCT CHG
STORAGE & PERIPHERALS OFF -0.6%				
ADPT 63.56 19.00 Adaptec	47.50	7.38	12.4	
APCC 32.50 13.08 American Power Conversion	28.13	1.63	5.7	
CANN 46.25 19.75 Canon Inc. (H)	42.38	3.63	7.9	
ORIO 34.08 19.68 Datasat Inc.	23.38	0.94	4.2	
FE 78.81 56.62 Exabyte/Kanaski Co.	58.84	4.89	7.4	
LMC 122.50 48.93 EMC	116.31	6.00	5.4	
IRM 174.37 2.87 Imagem (H)	4.00	0.19	4.5	
WAT 1.81 4.25 Wattec Corp.	8.75	0.69	9.2	
NATP 155.00 18.06 Network Appliance Inc. (H)	150.00	27.50	24.0	
LIX 186.87 42.09 Lexmark Int'l Group Inc. (H)	110.25	1.44	1.3	
SIO 48.87 25.12 Seagate Technology	48.13	2.88	6.2	
STK 40.87 10.75 Storage Technology Inc.	34.50	0.88	6.4	
TEK 42.41 17.56 Tektronix	42.00	1.06	2.8	
STR 63.93 19.00 Seagate	29.44	1.50	6.8	

KEY: (H) = New annual high reached in period

(L) = New annual low reached in period

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NETWORK UP 6.4%

52-WEEK NAME	FEB. 11 2PM	WK HIG	WK LOW	WK PCT CHG
NETWORK UP 6.4%				
COMS 80.37 20.00 3Com Corp. (H)	63.00	6.63	11.8	
ADIC 79.37 34.37 ADC Telecommunications Inc.	72.75	1.81	2.8	
ANIC 60.25 16.62 Arista	35.50	2.19	5.8	
BVNY 33.25 9.25 Barran Systems Inc. (H)	33.25	4.13	14.2	
CS 36.88 7.18 Cabletron Systems Inc.	36.88	6.88	30.8	
CENF 9.75 2.67 Cell-Net Enterprises	6.00	0.19	4.5	
CCSC 108.50 18.81 Ciena Systems Inc. (H)	103.63	4.14	6.3	
ECN 45.00 23.75 ECI Telecom Inc.	26.50	2.08	7.2	
ENTL 28.00 16.87 Entel Networks Inc. (H)	66.00	9.13	16.0	
HEC 40.63 16.50 Hewlett-Packard Co. (H)	41.44	6.14	14.9	

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Microsoft Support to Be Put to the Test This Week

Massive effort for Win 2k release includes training partners

BY KIM S. NASH
AND MATHEW SCHWARTZ

AS THIS WEEK'S launch of Windows 2000 approaches, Microsoft Corp. said it has spent more time and money readying itself to answer the questions of Windows 2000 customers than it has for any other product in its 25-year history.

Thousands of support people have been trained. Lists of frequently asked questions are posted on Microsoft's Web site. Specially created and downloadable migration tools are ready.

But will it be enough?

With Windows 2000, Microsoft hopes to prove that it can handle critical business applications that have traditionally run on Unix or mainframe systems. The product has been in beta testing at 750,000 customer sites, but, as with any large, new software release, there are still unknowns.

Windows 2000 is an entirely new operating system with new feature sets, a new Active Directory and reams of docu-

Win 2k Migration Cost Estimates

Analyst firms' predictions on the cost of migrating to Windows 2000 from various other operating systems — Windows 95/98, Windows NT4 and Novell NetWare 4.

FIRM	COST PER DESKTOP	COST PER SERVER
GIGA as of 10/12/99	\$970 to \$1,640	\$107/client (5,000 users)
META as of 1/24/2000	\$250 to \$1,800	not available
GARTNER* as of 1/31/2000	\$1,539 to \$2,563 (Windows 9x) \$1,075 to \$1,980 (Windows NT 4)	\$347 to \$486/user (NetWare 4.x) \$252 to \$353/user (Windows NT 4) (2,500 users)

Costs include installing and upgrading. *Additionally, includes support and training costs.

mentation, among other things that could spur user calls for help.

"First, they have made a bigger effort to get this OS right to start with, and second, to make sure they can do everything possible to answer questions. Our users want to see this all work," said Larry McJunkin, online director at WUGNet Publications Inc. in Media, Pa. WUGNet is the Windows Users Group Network.

Microsoft declined repeated requests for interviews with support executives.

But a Microsoft spokeswoman said that once the software ships en masse Thursday, the company's product-support unit plans to hold daily meetings to track any ongoing issues that arise.

Free migration help includes the following:

- Software tools at Microsoft's Web site to help users move off

of Unix and Novell Inc.'s NetWare.

- A Windows 2000 readiness Web site, where users can check whether their hardware and software are compatible (www.microsoft.com/windows2000/upgrade/compat/ready.asp).
- The Microsoft Readiness Framework, which is a kit to help users assess, for example, how to use Windows 2000's Active Directory.

Also free are new "envisioning" workshops aimed at guiding customers through migration planning and modeling. In addition, 8,000 product-support people are undergoing special Windows 2000 training, a Microsoft spokeswoman said, and another 1,400 people at partner companies have also been trained.

Yet for more detailed or user-site-specific help, Microsoft refers most customers to its third-party consulting partners, such as Compaq Computer Corp., Hewlett-Packard Co. and Unisys Corp.

Microsoft stands firm on its decision not to get too deeply into the consulting business, despite the requests of some of its customers. Though Microsoft consulting services are available to help companies

figure out how to migrate, the company hasn't provided a breakdown of what that could cost. Analyst firms, however, have compiled migration estimates (see chart).

"We have partners who are really good at that stuff, and the way we work is to help them deliver to customers," said Rick Maguire, a director of product strategy and offerings at Microsoft.

Last week, Microsoft and New York-based KPMG Consulting LLC announced a program to help users put up high-volume Web sites running on Windows 2000. KPMG plans to hire 500 consultants for the program, dubbed the Microsoft Dot.com Practice.

Some users are grateful for Microsoft's advice but prefer to do the actual migration work themselves because they feel that they know their systems best. "Microsoft is a such a core component of what we do in IT, so we have always maintained expertise on staff," said Jay Olson, information systems director at a Los Angeles division of Harte-Hanks Communications Inc., a direct marketing company.

At Travelers Property Casualty Corp. in Hartford, Conn., Windows 2000 will be installed on 22,000 workstations and 1,500 servers during the next 12 to 18 months.

"We have techniques we use to do rollouts of software to thousands of workstations," said Diana Beecher, Travelers' CIO. "We'll just go."

Continued from page 1

Thin Clients

Windows-based terminals (WBT), due from several vendors this spring, will support local printers and a local browser. Higher-powered terminals using Windows NT Embedded and running a more advanced Internet Explorer 5 browser are expected by midyear.

"From the cost perspective, choosing Windows-based Terminals was a no-brainer," said Joe Butler, director of informa-

tion technology operations at Los Angeles-based Frederick's of Hollywood Inc., which recently deployed 60 WBTs from San Jose-based Wyse Technology Inc. for a call center application. He said the decision saved him one full-time support person and \$500 per desktop, compared with PCs.

According to O'Brien, WBTs mainly replace terminals rather than PCs and are deployed for repetitive tasks in markets such as call centers and the financial industry.

Michael Gartenberg, vice president of personal distributed technologies at Gartner

Group Inc. in Stamford, Conn., said he expects a rise in the adoption of thin clients as many organizations opt for a more managed environment and try to avoid PC hardware updates.

Some users are finding other benefits, too. Dale Smith, network manager at Forest City Trading Group Inc. in Portland, Ore., said his company is accessing Windows NT 4.0, Terminal Server Edition, from ordinary desktop PCs, thereby avoiding sending enormous amounts of data over the network. He said the company prefers to have a PC on every

desktop. "But the way things are evolving, a year from now that could be different," he added.

Building Terminal Services into Windows 2000 poses a challenge to vendors of server software that perform similar functions. But O'Brien said he expects vendors such as Santa Cruz, Calif.-based The Santa Cruz Operation Inc., with its Tarantella Product, and Fort Lauderdale, Fla.-based Citrix Systems Inc., with MetaFrame, to "continue to plug holes in Microsoft's product."

Citrix, for instance, this week will announce technolo-

gy that lets a remote user with a browser see a Web page with links to all applications he's authorized to use.

On the Rise

Windows-based terminals

- 305,000 thin clients sold during the first half of this year
- Terminal Services included in Windows 2000 Server starting at \$999
- Access license required for clients not running Windows 2000 Professional (\$749 for five)

SOURCE: INTERNATIONAL DATA CORP. FRAMINGHAM, MASS.

FRANK HAYES/FRANKLY SPEAKING

Death-defying craziness

WANT TO HEAR something crazy? Forrester Research says the IT shop will be killed off in three years, its functions absorbed by outsourcers or the business departments currently served by corporate IT. Want to hear something even crazier? One reporter told me that for *Computerworld's* upcoming Premier 100 feature, he asked IT chiefs what they thought of getting top corporate management — we're talking CEO and board level here — involved in picking technology and vendors. Roughly half the IT bosses thought it was the right approach. The other half bristled at the very idea.

Now *that's* crazy. Of course top brass should be involved. OK, sometimes it shouldn't be much more than the way your 5-year-old is involved in picking the new car. But sometimes those bigwigs actually know something you don't — say, about a merger or spin-off or partnership or new business in the pipeline that needs certain products or technologies. Keep 'em smartened up, and maybe they can keep you from wasting millions of dollars and months of time and effort.

And the notion that the IT department will go the way of the dodo in three years? Baloney. This time, grandstanding Forrester analyst Bobby Cameron missed the boat.

The IT shop doesn't have three years left. It doesn't have three minutes. It died years ago.

Want proof? Everything that was the heart and soul, the defining characteristics of the traditional IT shop, is gone. Everything. The two-year pipeline for applications. The revolving door on the CIO's office. The splendid isolation of the glass house — user requirements thrown over the wall, finished systems chucked back.

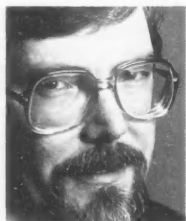
That grand old IT shop is long gone, bulldozed and buried by business and technical realities — PCs and Y2k, mergers and downsizing, e-commerce and tech-smart users. It's dead. Deceased. Pffft. And good riddance.

What survives is enough to give anybody an identity crisis, that's true enough. We're doing everyone else's job, and they're doing ours. With e-commerce and ERP, we're hip-deep in sales, marketing, manufacturing and logistics. The departments that used to have a corner on

those things are now buying technology, prototyping applications and swearing at vendors — our old specialties.

Some users like to think they can handle all their own tech needs. But those grand delusions generally evaporate when the network dies or some assembly-required software turns out to be a little too complicated. Outsourcing? They love it for well-defined projects they can afford to bill by the hour. But when they want to squeeze a buck or sneak by with fuzzy specs on a little project, they still turn to IT.

We're doing everyone else's job, and they're doing ours.



And they will — at least if we don't get nutso about being an integral part of the business. That means we talk to everybody, from users in the trenches to top brass in the boardroom. We pick their brains, they pick ours. We think business, they think technology. Everybody's in the loop.

The old IT shop — and that old IT/business divide — is already dead. But IT, or whatever we'll call it tomorrow, has a long road ahead of it.

Actually, I suspect Bobby Cameron — an ex-IT guy from Chase Manhattan — knows it's bunk when he says the IT shop will be gone in three years. But he also knows nobody will hold him to his prediction — in 2003, who will remember?

And bunk or not, he knows "The Death of IT" will rattle a lot of cages. Maybe it'll even shake some IT bosses out of their craziness about being part of the business. ▀

Hayes, *Computerworld's* staff columnist, has covered IT for more than 20 years. His e-mail address is frank_hayes@computerworld.com.

SHARK TANK

THIS PILOT FISH is proud of the big paperless-office initiative, she really is. Users automated 20,000 documents in 1999.

Now almost all authorizations are handled electronically. With one notable exception: "All changes to the online system must be requested to the MIS manager," she says. "On paper. They're the only paper-based authorization forms left."

SOME UNPACKING REQUIRED Consultant builds and delivers Web-based system for a client that's, well, none too sharp. A month later, the office relocates. Consultant boxes up the system on the morning of the move and leaves "explicit details on setting it up at their new location," he says. Postmove, the system manager calls: They can't access the system. "I asked if it looked like the system was getting power. After a few minutes, the system manager exclaimed, 'I think the machine is turned off in the box.'"

TURKEY SUPPLY NOT THE PROBLEM November. ERP project hits crunch time. Boss tells the staff that to meet the year-end deadline will take 60-hour weeks, including every weekend. No Thanksgiving off. But that's no problem at all, says the boss: She "likes to cook and [will] make a turkey for us," a

pilot fish reports. Uh-huh. Must have been just like celebrating at Grandma's.

Y2K-PLUS-SIX-WEEKS and counting: One pilot fish reports a search for e-commerce pages on the U.S. Commerce Department Web site turns up several dated 1899. Another pilot fish says if you want to buy a telephone from AT&T's online store (telephones.att.com/store), be prepared for pages that claim to be from 19100.

KNOW THE CODE A wand ad for a systems analyst in Atlanta, along with the usual knowledge of TCP/IP, Novell and Windows, requires "ability to lift a minimum of 25 lb. [and] stand, sit and view small print for extended periods." Maybe they're just trying to avoid applicants with disabilities, but one pilot fish thinks it translates like this: "Get your Radio Flyer wagon! Haul those mainframe printouts! Read that six-point type!"

Sharky has squinted at enough green-bar to last a lifetime, but he wouldn't mind seeing one more page if you're dishing dirt about a boss or vendor: sharky@computerworld.com. Print out the daily report: computerworld.com/sharky. If it gets published, you get a Shark shirt.

The 5th Wave



"Children— it is not necessary to whisper while we're visiting the Vatican Library Web site."

E-mail: richman@thefive.com

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MISSION

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sales selling, accounting
counting and marketing
doing whatever it does.

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